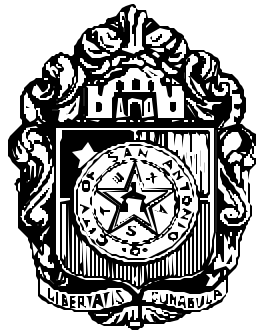


UTILITY EXCAVATION CRITERIA MANUAL
(UECM) FIRST EDITION
GENERAL REQUIREMENTS AND PROCEDURES
FOR
EXCAVATION IN CITY OF SAN ANTONIO
PUBLIC RIGHTS OF WAY



CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DATE: April 2, 2001



CITY OF SAN ANTONIO

P.O. BOX 839966
SAN ANTONIO, TEXAS 78283 – 3966

NOTICE TO ALL EXCAVATORS IN CITY OF SAN ANTONIO PUBLIC RIGHT OF WAY

The Utility Excavation Criteria Manual (UECM) has been prepared as a guide for City agencies, utility companies, contractors, Right of Way Users and others excavating in the public right of way of San Antonio, Texas.

The main purpose of the Manual is to collect the various specifications, rules and regulations governing excavations in the public right of way into a single document. The user of the Manual is responsible for ensuring that all documents contained therein are kept up to date. To assist the users the City will notify all users on record of changes made to the Manual.

The main focus of the regulations is to:

- Protect the traveling public;
- Improve coordination of street work;
- Minimize the impact of excavation in the public right of way and;
- Recover cost of damage done to streets by excavations.

Before excavating in any public right of way within the City limits, excavators are encouraged to familiarize themselves with the requirements of this manual.

If you have any questions or would like to arrange a training session on this manual please contact: Armando A. Aranda, Jr., Street Maintenance Division Manager, 7402 S. New Braunfels Ave., San Antonio, TX 78223, 210-359-3100 – Office; 210-359-3133 – Fax; e-mail address: rockya@ci.sat.tx.us.

Thomas G. Wendorf, P.E.
DIRECTOR OF PUBLIC WORKS

INTRODUCTION

Inevitably, much of a utility's facilities are buried beneath street pavement or other paved areas in Public Rights of Way. Thus, in order to access existing facilities, install new pipelines, appurtenances, etc. there is a need to cut the street pavement structure. In recent years, coordination between agencies and utilities has improved so that the bulk of utility work is scheduled to occur prior to pavement construction, rehabilitation or resurfacing activities, thus avoiding (to the maximum practical extent) the cutting of new pavements. However, unscheduled cuts cannot be entirely eliminated. Leaks must be repaired; new customers wanting service must be connected up on demand, and so forth. Thus there will always be utility cuts in both new and old pavements.

The crucial issue after the utility has performed the work that necessitated the cut in the first place, is to restore the pavement to a satisfactory structural and rideability standard. This encompasses the need to match the structural parameters and performance of the surrounding pavement, and the need for good workmanship to provide a riding surface that merges smoothly with the surroundings and avoids sudden changes of elevation or slope. The structural and rideability needs are separate but intertwined.

The City of San Antonio is concerned and charged with the maintenance of a fundamental infrastructure component that provides modal carriage for safe transportation, quality of life, etc. As the City continues to expend funds for the maintenance of streets, investment preservation and sustenance must be exercised. Proper barricading providing advance warning and work zone precautionary notice is significant in the City's effort in providing a safe intermodal environment. This manual includes guidelines for work methods and related safety procedures to follow and materials to be used by those involved in utility work within the City of San Antonio's Rights of Way.

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Chapter 1

GENERAL REQUIREMENTS

GENERAL REQUIREMENTS

1.1.0 CHAPTER INCLUDES

Research submittal requirements for projects within the Rights-of-Way inside the city limits of San Antonio.

1.2.0 REFERENCES

The following references should be reviewed in conjunction with this manual:

- A. Chapter 29, Sec. 29-106 through 29-204, City code of the City of San Antonio
- B. Unified Development Code, Chapter 35 of the City Code of the City of San Antonio
- C. City of San Antonio Standard Specifications for Public Works Construction.
- D. City of San Antonio Flood Prone Areas, Chapter 19 of the Code of Ordinances, latest revision.
- E. Texas Accessibility Standards (TAS) of the Architectural Barriers Act, Article 9102, Texas Civil Statutes.
- F. Rules and Regulations published by Texas Natural Resource Conservation Commission (TNRCC).
 - 1. TNRCC, Water Utilities Division, Rules and Regulations for Public Water Systems, latest revisions.
 - 2. TNRCC, Design Criteria for Sewerage Systems, Texas Administrative Code, Chapter 317 latest revision.
- G. State of Texas Engineering Practice Act.
- H. State of Texas Professional Land Surveying Practices Act.
- I. Storm Water Management Handbook for Construction Activities, Latest Edition as Prepared by City of San Antonio.
- J. San Antonio Water System Rules & Regulations and Standard Specifications.
- K. Bexar Metropolitan Water District Standards.

1.3.0 DEFINITIONS

- A. **CITY ENGINEER** – The authorized representative of the City, or his designee, having approval authority for privately- funded projects, or having authority for administration of design and construction contracts for the City of San Antonio.
- B. **REVIEW AUTHORITIES** – The authorized representative of City departments, divisions, or sections responsible for reviewing and approving calculations and drawings for privately funded projects and for design and construction contracts with the City of San Antonio.
- C. **DRAWINGS** – Plan, profile, detail and other graphic sheets to be used in construction contract which define character and scope of the project.
- D. **DESIGN ANALYSIS** – Narratives and calculations necessary to support design of a project.
- E. **PROFESSIONAL ENGINEER** – An engineer currently licensed and in good standing with the Texas Board of Professional Engineering Land Surveying.
- F. **PROFESSIONAL LAND SURVEYOR**-A Surveyor currently registered and in good standing with Texas Board of Professional Land Surveying.
- G. **SPECIFICATIONS** – City of San Antonio Standard Specifications for Public Works construction projects, plus project-specifications narrative descriptions of procedures, requirements, and materials for a particular project.

1.4.0 QUALITY ASSURANCE

- A. Research existing utility and right-of way information with the City departments listed below. Present and discuss the concept of the project with these same departments.
 - 1. Asset Management Department
 - 2. Department of Public Works
 - a. Right-of-Way Management Section
 - b. Street Maintenance Division

- c. Streets and Traffic Engineering
 - d. Stormwater Utility
 - e. Capital Projects Division
- 3. Planning Department
- 4. Parks and Recreation Department
- B. Research existing utilities and right-of-way or easements for conflicts with the following public and private organizations.
 - 1. Texas Department of Transportation
 - 2. Telecommunication Companies:
 - a. Southwestern Bell Telephone
 - b. MCI
 - c. Sprint
 - d. Metro Media Fiber Network
 - e. Grande Communications
 - f. Next Link
 - g. XOXO
 - h. US Online Cable
 - i. Multi Technology Service
 - j. Brooks Fiber
 - k. ICG
 - l. Espire
 - m. Enron
 - n. Level 3
 - o. Teleport
 - p. Williams Communications
 - q. Western Integrated Network
 - r. ITC-Delta Com
 - s. Cap Rock
 - t. Adelphia Business Solutions
 - u. Fiber America
 - v. Grande River Communications
 - w. El Paso Communications
 - x. GST Telecommunications
 - 3. Cable Television and data companies
 - a. Time Warner
 - b. Grande Communications
 - c. Western Integrated Networks
 - 4. Other utility companies:
 - a. San Antonio Water System
 - b. City Public Service
 - c. Utility districts
 - d. Private utilities/franchise
 - e. Railroad companies
 - f. Pipeline companies
- C. Verify that no restrictions or conflicts exist that will prevent approval and permitting of the project

1.5.0 DESIGN REQUIREMENTS

- A. Preliminary Design.
 - 1. Privately Funded Projects:

- a. Prior to preliminary design submittal, City reviews are available to discuss alternate solutions for project elements when alternate designs may be considered.
 - b. Provide the City Engineer with drawings in sufficient detail to describe the proposed improvements. Include proposed materials, if different from materials approved by the City. Identify any problems or conflicts associated with the project. Information furnished must be sufficient details for the City Engineer to assess whether the design meets current City design standards.
 - c. Provide rights-of-way and easement requirements for the project.
- 2. Design Contracts with the City.
 - a. Participate in preliminary conferences with the City Engineer outlining the scope of work and extent of the preliminary report.
 - b. Prepare preliminary engineering studies and designs based upon the scope of work and as outlined in the professional engineering services contract with the City.
 - c. Prepare the contractually specified number of copies of preliminary layouts, sketches, reports and calculations supporting the preliminary layouts. Prepare alternative solutions, where applicable to the project, and include the engineer's specific recommendations.
 - d. Prepare preliminary cost estimates for primary and alternate solutions of the proposed construction.
 - e. Participate in conferences with the City to determine final design.
 - f. When required by the professional services contract, provide detailed soils and geotechnical investigations to support proposed construction of utilities and paving.
 - g. Provide required real estate, rights-of-way, and easement requirements for the project.
- B. Final Design.
 - 1. Privately-funded Projects:
 - a. Revise design to reflect comments of the City Engineer and review authorities. Include design calculations to support proposed improvements.
 - b. Provide review prints to the City Engineer and review authorities for verification and compliance with prior review comments.
 - c. Obtain required signatures from governmental agencies (other than the City of San Antonio) and private utility companies prior to requesting signature by the City.
 - d. Include the following note on construction drawings, "Contractor shall notify the City of San Antonio, Department of Public Works (210) 207-6949 48 hours before starting work on this project."
 - 2. Design Contract with the City:
 - a. Furnish the City, where applicable, engineering data necessary for applications for routine permits required by local, state and federal authorities.
 - b. Prepare detailed final design drawings and specifications in compliance with comments received from the City subsequent to the review of the preliminary design.
 - c. Prepare detailed cost estimates and proposed forms for the authorized project.
- C. Original Documents
 - 1. Approved drawings will be assigned a City Project number and must be filed in the City file room prior to issuance of a utility excavation permit. Tracings will

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become property of the City of San Antonio and will remain on file in the file room for use only by City Staff who may be interested in the project.

END OF CHAPTER

Chapter 2

COORDINATION OF UTILITIES

COORDINATION OF UTILITIES

2.1.0 GENERAL

To provide coordination among all users of the public right-of-way, a coordination process is established to review projects that require construction within the right-of-way. The objective of the process is to identify and resolve any potential conflicts before construction begins.

2.1.0 CHAPTER INCLUDES

The various phases of coordination described with the respective responsibilities.

2.2.0 COORDINATION PROCESS FOR CAPITAL IMPROVEMENT PROJECTS

The project Design Engineer works directly with the Director and the coordination committee to obtain information of existing facilities located in the public right-of-way and within the project limits. The Project Designer shall submit 10 copies of the Drawings and Specifications, a description of the project, project contact, phone and fax numbers to the Director, who distributes the Drawings, Specifications and information of the various utilities and entities having vested interest in the project. The Director shall schedule a review meeting within three weeks after the plans are distributed.

Utility Owners shall submit written comments and a copy of facilities maps if available for the project limits. Every effort shall be made to incorporate the comments and information provided by the Utility Owners into the project design.

In the utility coordination process a project is considered to have six phases of development. The phases are Schematic, Preliminary A, Preliminary B, Final Design, Pre-Bid and Pre-Construction. Each phase is described below with the respective responsibilities of the Project Design Engineer, Utility Owners, and Director.

- A) **SCHEMATIC** – The Project Design Engineer is responsible for submitting a written request to the Director to place a project on the utility coordination agenda. The request shall include 10 sets of Drawings and Specifications or sketches with a description of the proposed work, project title, and the project limits.

The Director shall notify Utility Owners of the proposed project and schedule a meeting with Project Design Engineer and Utility Owners having vested interest in the project. The Director shall log and establish a file for the project. A meeting called the Schematic Meeting will be scheduled within three weeks after the notification is sent to the Utility Owners.

At the Schematic Meeting, the Director shall chair the meeting and record minutes. The Project Design Engineer or designated representative shall attend the meeting to answer questions pertaining to the project. Utility Owners having facilities within the project limits shall submit record information and/or comments at the Schematic Meeting.

- B) **PRELIMINARY PHASE A (30%)** – In preparation for the Preliminary Phase A review meeting, the Project Design Engineer shall perform a survey of visible surface utility features and augment the information with information obtained in the Schematic stage. The Project Design Engineer is responsible for surveying the area and obtaining information of visible features (i.e. manholes, valve covers, telephone poles, streetlights, etc.) and investigates any discrepancies and tries to resolve them with the proper Utility Owners.

The Project Design Engineer shall submit 10 sets of Drawings and Specifications for review to the Director. The Director will distribute Drawings and Specifications to Utility

Owners having vested interest in the project and will schedule a meeting to review the project.

Utility Owners may elect to field-mark the facilities in the area of the project and arrange with the Project Design Engineer to field survey the locations of the facilities. The Department may elect to have facilities located if Utility Owner does not provide the requested information.

At the Preliminary Phase A (30%) Meeting, the Director shall chair the meeting and record minutes. The Project Design Engineer shall attend the meeting to answer questions pertaining to the project. Utility Owners having facilities within the project limits shall submit record information and/or comments not previously submitted. Utility Owners shall indicate any facilities they intend to install, upgrade, or replace. All proposed work within the project limits shall be coordinated with the Project Design Engineer.

- C) PRELIMINARY PHASE B (60%) – The Project Design Engineer will incorporate the above information into the project design and develop another set of Drawings that indicate suspected locations of conflict with existing utilities. The Project Design Engineer will submit a request to the Director to review the project with the appropriate number of Drawings and Specifications. The request will include the names of the Utility Owners that have facilities in possible conflict with the project. The request may also include any updates on the projects. The Director will distribute 10 sets of plans to Utility Owners and schedule a meeting to discuss the identified conflicts. At this level of the design, the Utility Owners will be requested to provide vertical location of their facilities at the indicated location of possible conflict.
- D) FINAL DESIGN PHASE (90%) – The Project Design Engineer will strive to design around existing facilities as much as possible to reduce relocation of existing facilities. After all possible alternates to relocation of existing facilities are exhausted a utility adjustment schedule will be developed and adjustment will commence. Utilities will be allowed to adjust, install, and upgrade their facilities during the period of advertisement and bidding of the project up until the notice to proceed is given to the successful bidder. No utility work (except emergencies) will be allowed during civic construction unless arrangements have been made with the Director.

All adjusted and new facilities will have a minimum cover of 30 inches or in the case of rock/limestone formations a minimum depth assigned to the Utility Owner by the City that assures an appropriate cover depth of the utility below the subgrade. The City shall insure that the depth assignment is based on a subgrade level that extends below any existing severely weathered rock/limestone layer (i.e. layers composed of fissured rock limestone interbedded with clay, silt, sand, etc.).

The Project Design Engineer will be responsible for arrangements to have the project staked and provide final cuts as needed to the utilities. The Project Design Engineer will provide control points. Utility Owners will be expected to adjust one time for each project unless the Utility Owners relocate or install facilities that are in conflict with the current design. If the design of the project changes after the Utility Owners have cleared a project, the cost of second relocation will be borne by the City. Utility Owners, who relocate facilities before final plans are complete, do so at their own risk.

The Director will keep records of only those projects having a Capital Improvement Program Identification (CIP ID) Number and appearing in the Project Status Report. Records for all other projects will be the responsibility of the Project Design Engineer. The Director will maintain a log of all review meetings for all projects.

If the design is altered, or the project is delayed for an extended period, it may be necessary that additional reviews be made to ensure clearance by all utilities.

2.2.1 PRE-BID

Pre-bid meetings will be scheduled with members of the Project Design Engineer, the Director, Utility Coordinators of respective utilities and interested contractors who will bid on the proposed project. A Question and Answer period will be held to allow the contractors to discuss the various options of the job and status of utility adjustments.

2.2.2 PRE-CONSTRUCTION

Utility Owners shall attend the pre-construction meeting to provide status information of facilities relocation work. It is extremely recommended that Utility Coordinators attend all Pre-Construction meetings for projects involving their facilities.

2.3.0 SCHEDULED WORK (SHORT TERM)

All Right-of-Way users must be enrolled with the San Antonio Area Utility Coordination Council (SAAUCC). All agencies and utility owners engaged in work within public right-of-way must distribute information regarding projects. Refer to Section 29-117 through 29-120 regarding permitting procedures for scheduled work

2.1.0 EMERGENCY EXCAVATION

All emergency excavations must be reported immediately to the Right-of-Way Management Section, 207-6949, Monday through Friday, 7:45 a.m. to 4:30 p.m., all other hours, day or night should be reported to the Public Works Department Emergency Duty Station at 207-8880. Pavement repairs made to emergency excavations will be considered temporary and must be inspected and restored in accordance with Chapter 4 of this manual. Utility owner must obtain a permit within 24 hours of the following working day. Excavation authorized by this section shall be subject to all fees and requirements in accordance with Chapter 29 of the City Code.

END OF CHAPTER

Chapter 3

**UTILITY ASSIGNMENT
IN
RIGHT-OF-WAY**

UTILITY ASSIGNMENT IN RIGHT OF WAY

3.1.0 GENERAL

If the utility agency selects to place their utility line(s) within a public right of way, the utility line(s) shall be installed in accordance with the following requirements:

- (A) The locations of utilities in any new development or in replacement of the existing utilities in a developed area shall be in accordance of standard drawing 3.4.1 through 3.4.6.
- (B) The replacement of existing utility lines within a public right of way in a developed area may not be in accordance with section 3.1.0 (A) if the length of the replacement is less than two city blocks but not more than 1500 feet.
- (C) If the length of the replacement is more than two city blocks or more than 1500 feet, the utility replacement shall be in accordance with standard drawing 3.4.1 through 3.4.6, unless the assigned location is occupied by another utility which will not be replaced. The utility line can be replaced at a location selected by the utility agency. This will not require a variance.
- (D) The utility agencies shall be responsible to coordinate their work within a right of way with all other utility agencies.
- (E) Utility agencies are encouraged to provide maps of new utility locations to the Public Works Department.
- (F) When a sanitary sewer line is located at the center of a street, at the curved section of the street, the sanitary sewer line may not be located at the center of the street.
- (G) Minor variations to both vertical and horizontal alignment that is required to avoid conflict with storm sewer inlet, sanitary sewer manhole, street light pole, traffic signal pole, etc. will be granted and do not require a variance.
- (H) When a sanitary sewer and/or water line is placed under pavement, an adequate number of stub-outs must be provided for future connection(s) in order to avoid cutting the pavement.

3.2.0 UTILITY LOCATIONS

3.2.1 Horizontal Location: All utilities shall be installed horizontally as shown on the standard drawing 3.4.1 through 3.4.6.

3.2.2 Vertical Location: The depth of utilities shown on the standard drawing are the minimum cover and must be provided. All utilities shall be installed in accordance with the regulatory agency's requirements.

3.2.3 Clearance From Other Utilities: Any utility crossing another utility line shall maintain a minimum of twelve inches (12") clearance.

3.2.4 Fire Hydrant Location: Fire hydrants shall not be located within sidewalks and/or wheelchair ramps. Fire hydrants shall not be located less than two feet (2') from the back of the curb or the projected future curb.

3.2.5 Street Crossings: All utilities crossing on a residential street which pavement is less than five (5) years old or pavement condition index (PCI) greater than eighty-five (85) and on a collector street which pavement is less than seven (7) years old or PCI greater than eighty-five (85) shall be installed by boring and jacking unless approved by the Director of Public Works. Appropriate encasement and grouting must be used.

3.2.6 DRAINAGE DITCH AND STREAM CROSSING

- (A) Crossing under a stream or ditch is preferred by the City. The top of the carrier pipe shall be designed to provide a minimum clearance of at least four feet (4') below the ultimate flow line and sides of the ditch and with sufficient bottom length to exceed the ultimate future ditch sections. If the carrier pipe is concrete-encased, the top of the

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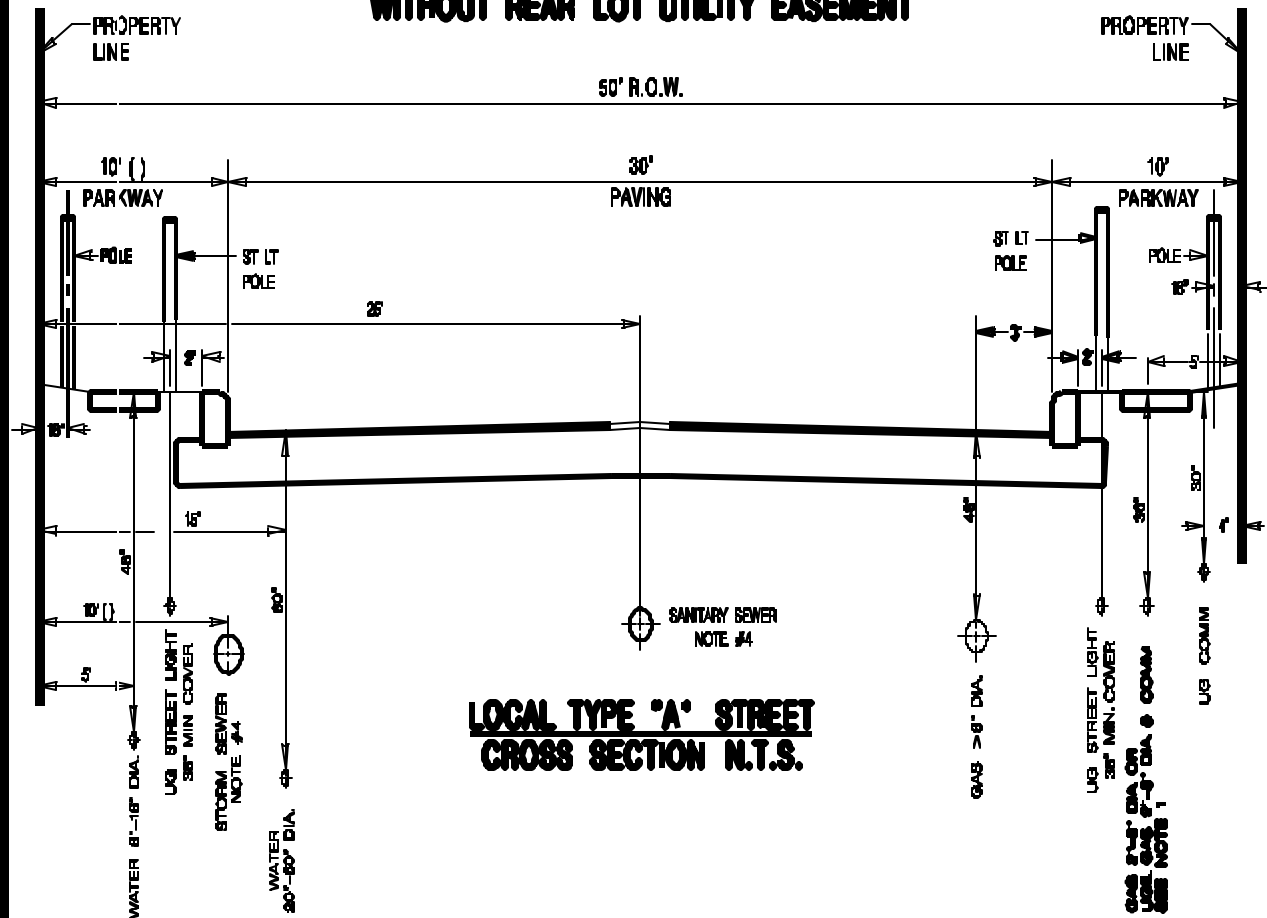
carrier pipe shall be a minimum of one foot (1') below the ultimate flow line of the channel.

- (B) Where existing or proposed bridges have sufficient space and structural capacity for installing water mains or conduits (twelve inches (12") or smaller) under the bridge, but above the top of the bent cap elevation, such installation will be permitted upon specific approval of the construction plans. In all cases the water main or conduit shall be above the bottom chord of the bridge and eighteen inches (18") above the 100-year flood water surface elevation. All conduits attached to a bridge shall be constructed using steel pipe and shall extend a minimum of ten feet (10') beyond the bridge bent or to the right of way line, whichever is greater. All conduit attached to a bridge shall be maintained by the owner of the conduit or will be subject to removal. Bridge attachment is the least desirable condition.
- (C) Separate, free-standing crossings across drainage ways are not allowed.
- (D) All stream or ditch crossings shall be constructed of steel pipe or concrete encased PVC from right of way to right of way. If the utility crossing is bored and the top of the carrier pipe is more than four feet (4') below the ultimate flow line of the channel, steel pipe or concrete-encased PVC may not be used.

3.3.0 VARIANCE PROCESS

An owner of a utility shall be responsible to request a variance from the Director of Public Works. If a utility is placed outside of the assigned area shown on the standard drawing 3.4.1 through 3.4.6 without a variance, the owner shall be responsible for relocating the utility to the assigned location at no cost to the City.

NEW CONSTRUCTION WITHOUT REAR LOT UTILITY EASEMENT



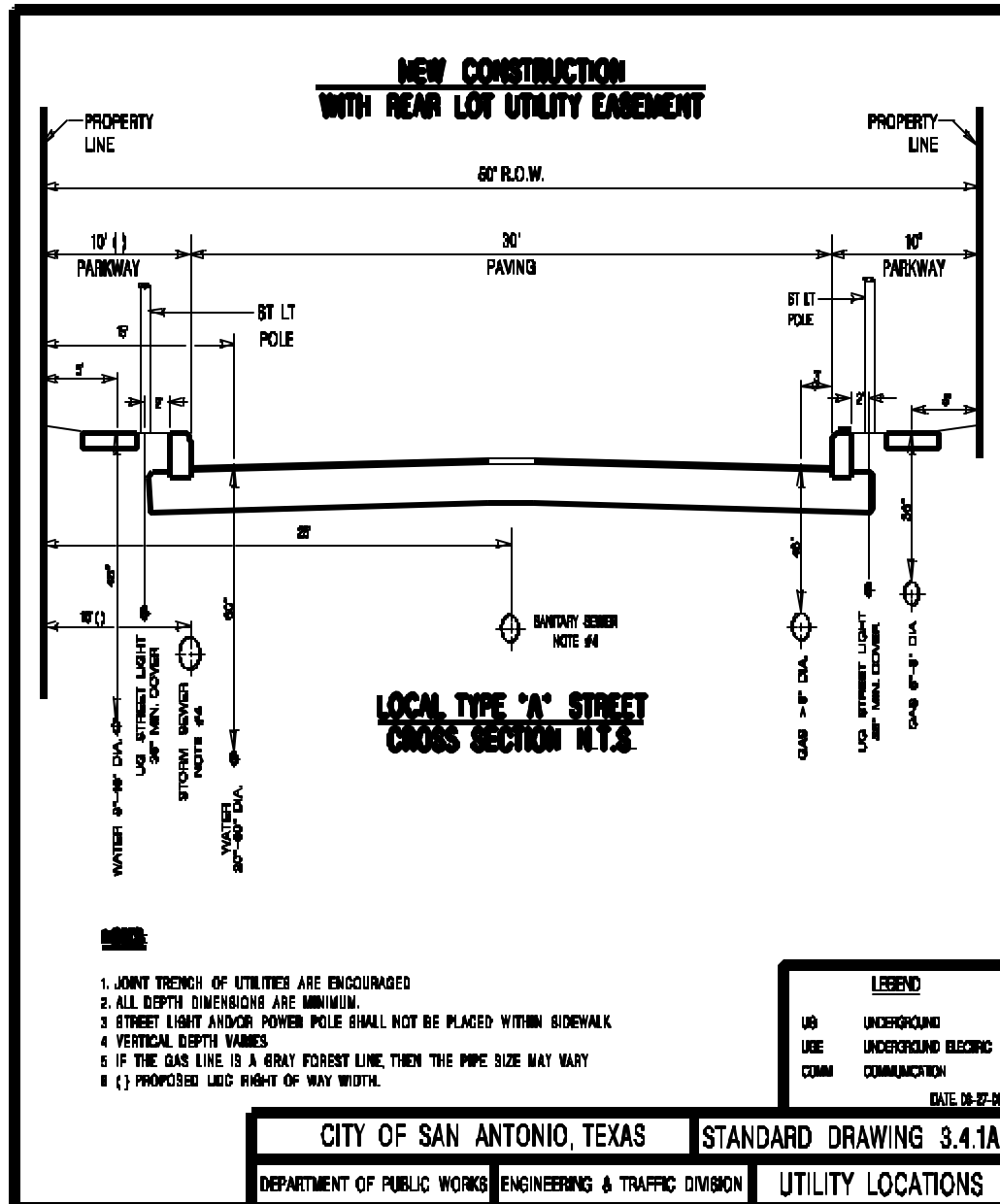
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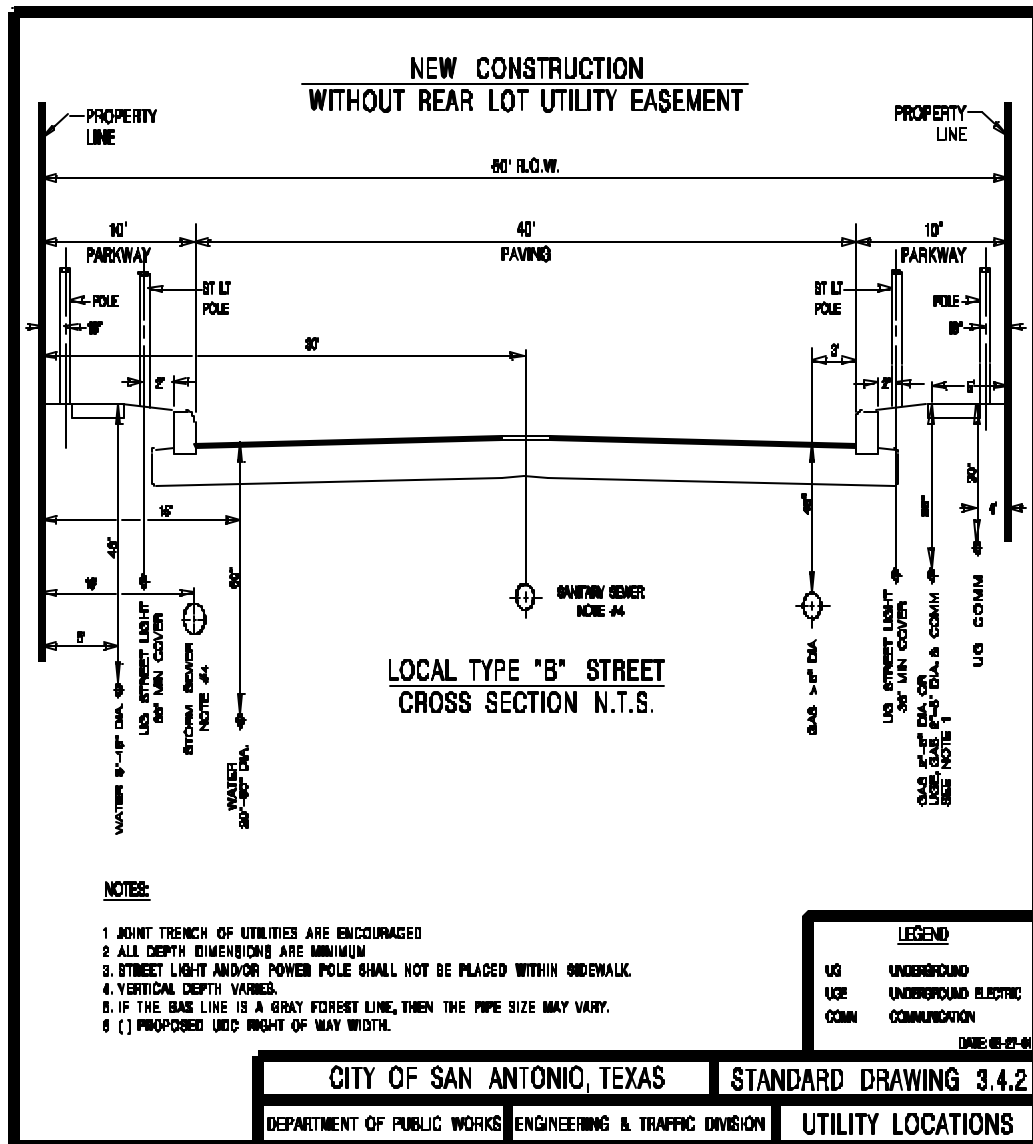
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2. ALL DEPTH DIMENSIONS ARE MINIMUM.
3. STREET LIGHT AND/OR POWER POLE SHALL NOT BE PLACED WITHIN SIDEWALK.
4. VERTICAL DEPTH VARIES.
5. IF THE GAS LINE IS A GRAY FOREST LINE, THEN THE PIPE SIZE MAY VARY.
6. () PROPOSED UDC RIGHT OF WAY WIDTH.

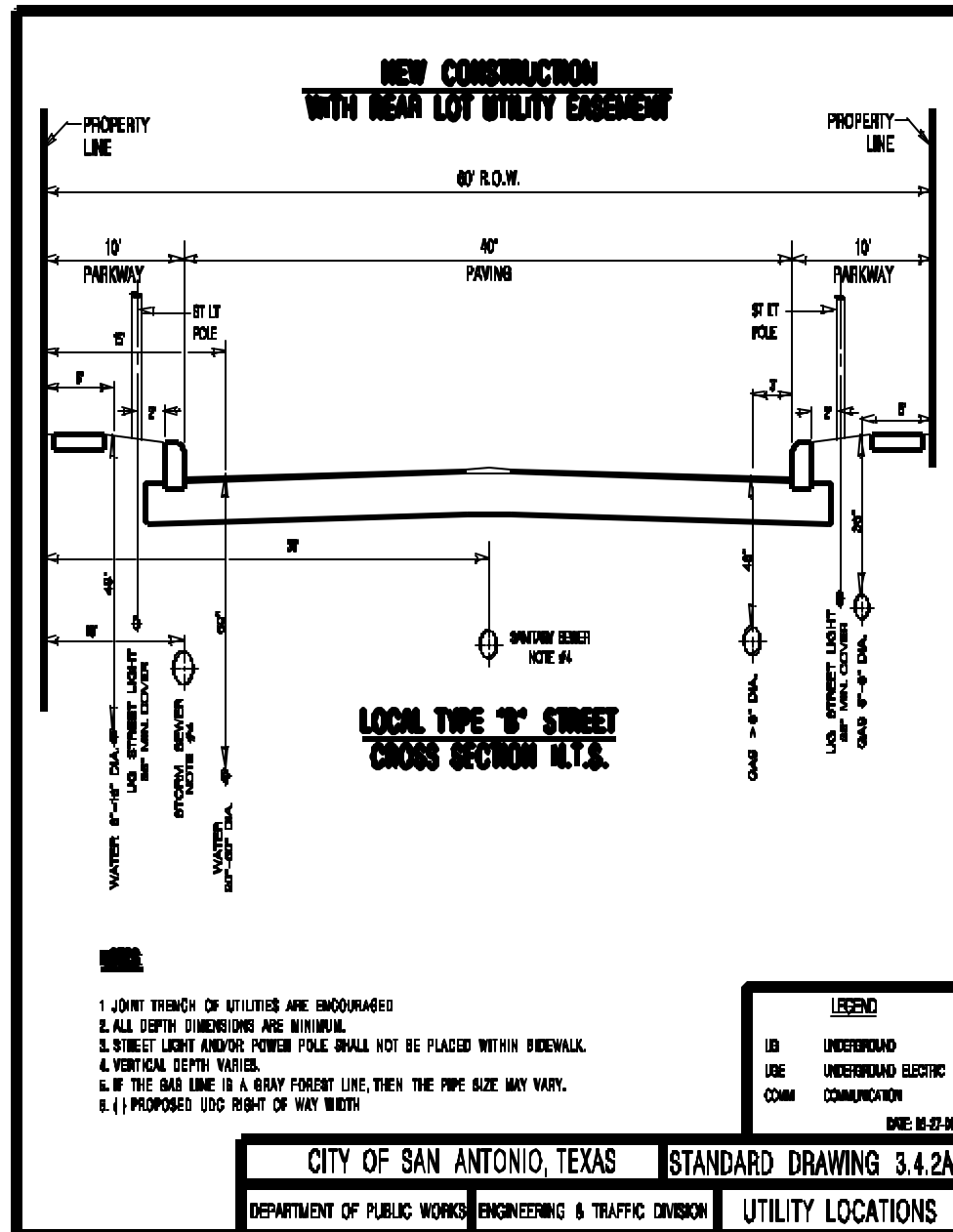
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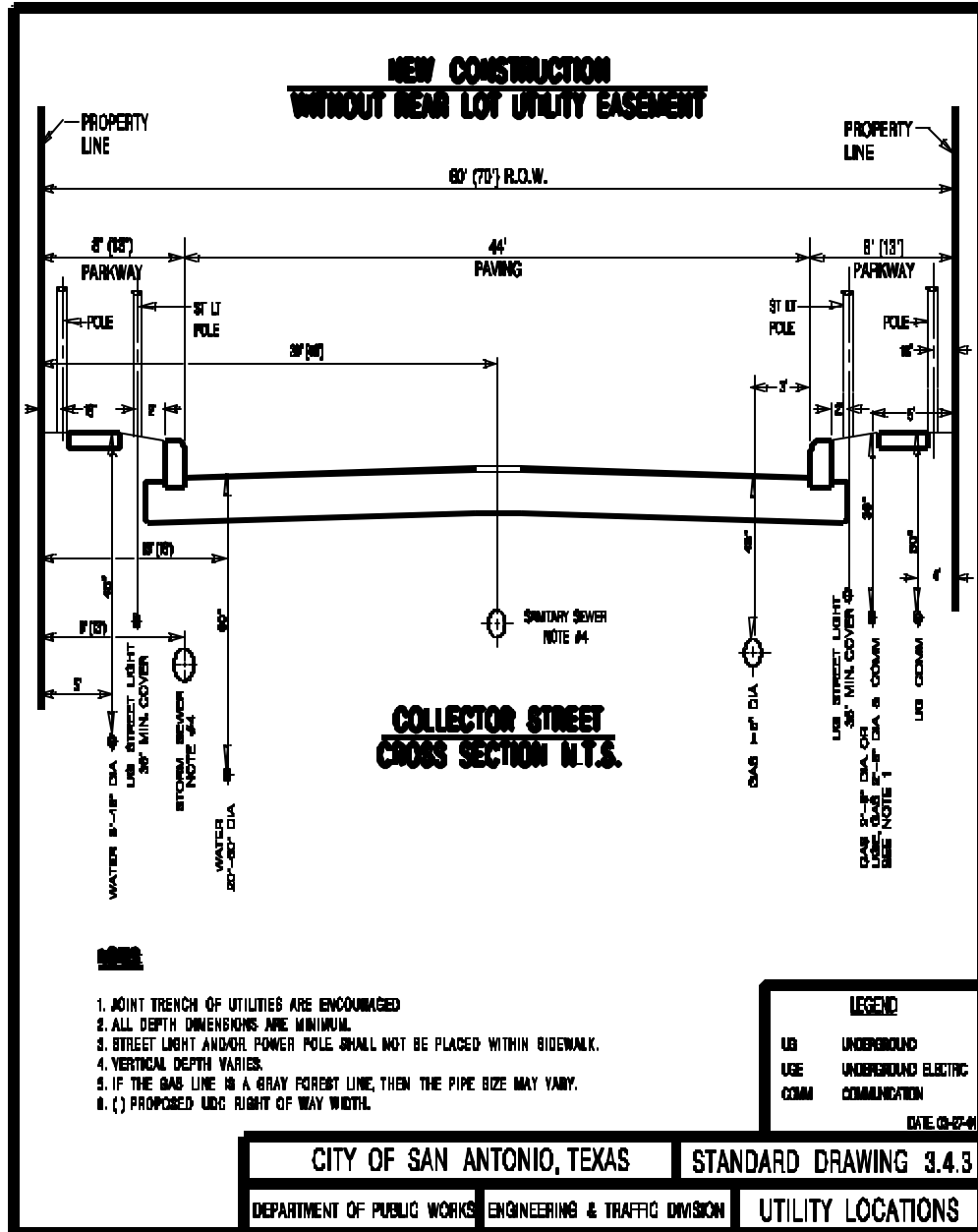
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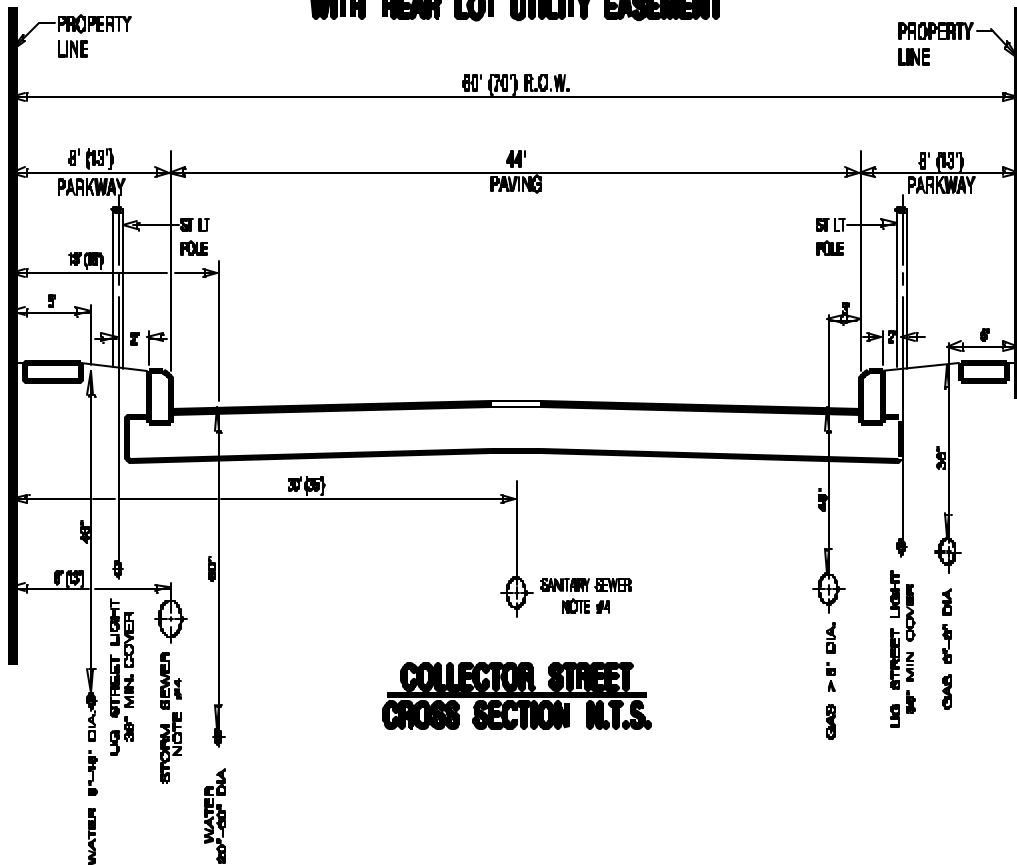








NEW CONSTRUCTION WITH REAR LOT UTILITY EASEMENT



COLLECTOR STREET CROSS SECTION N.T.S.

NOTES

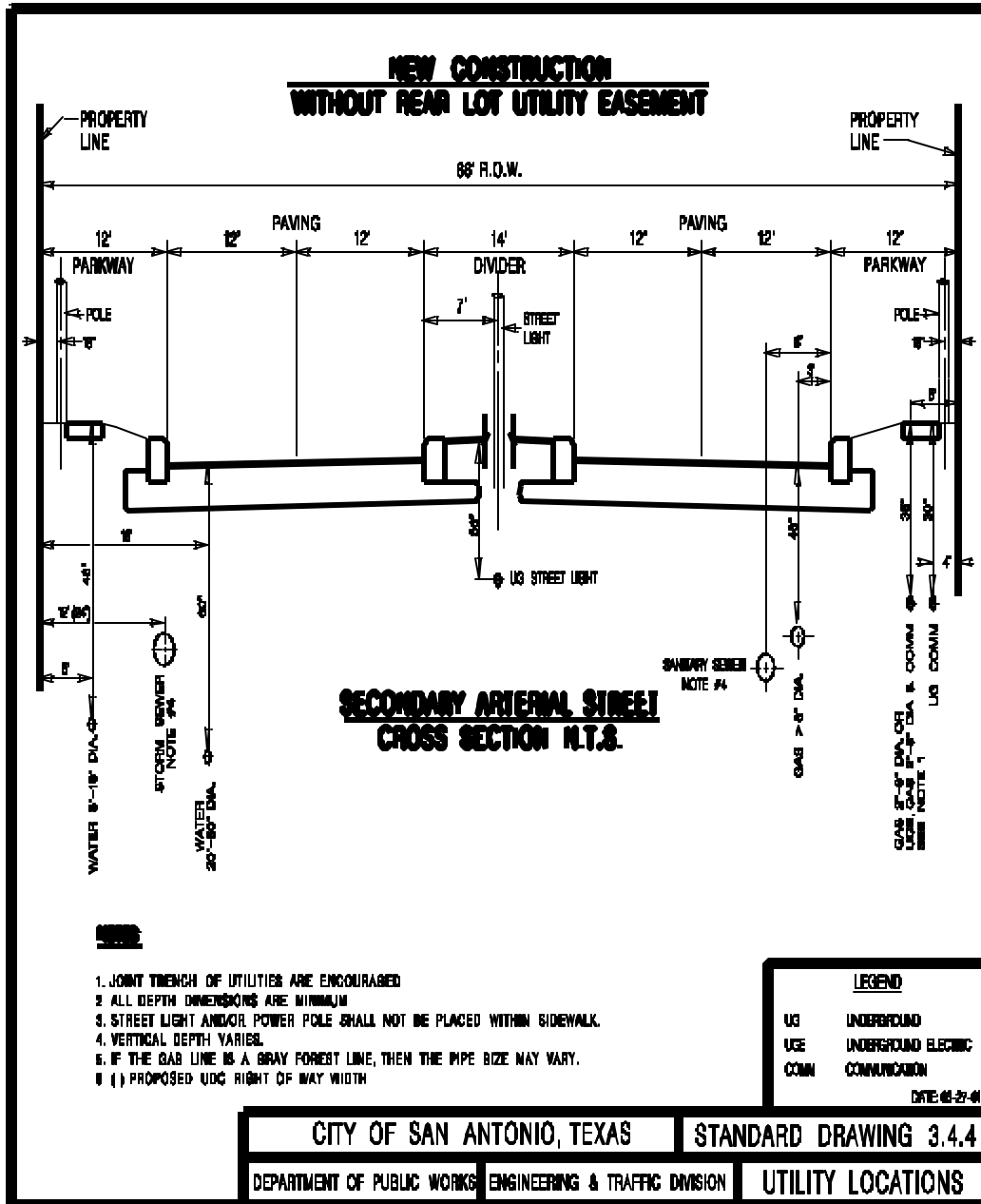
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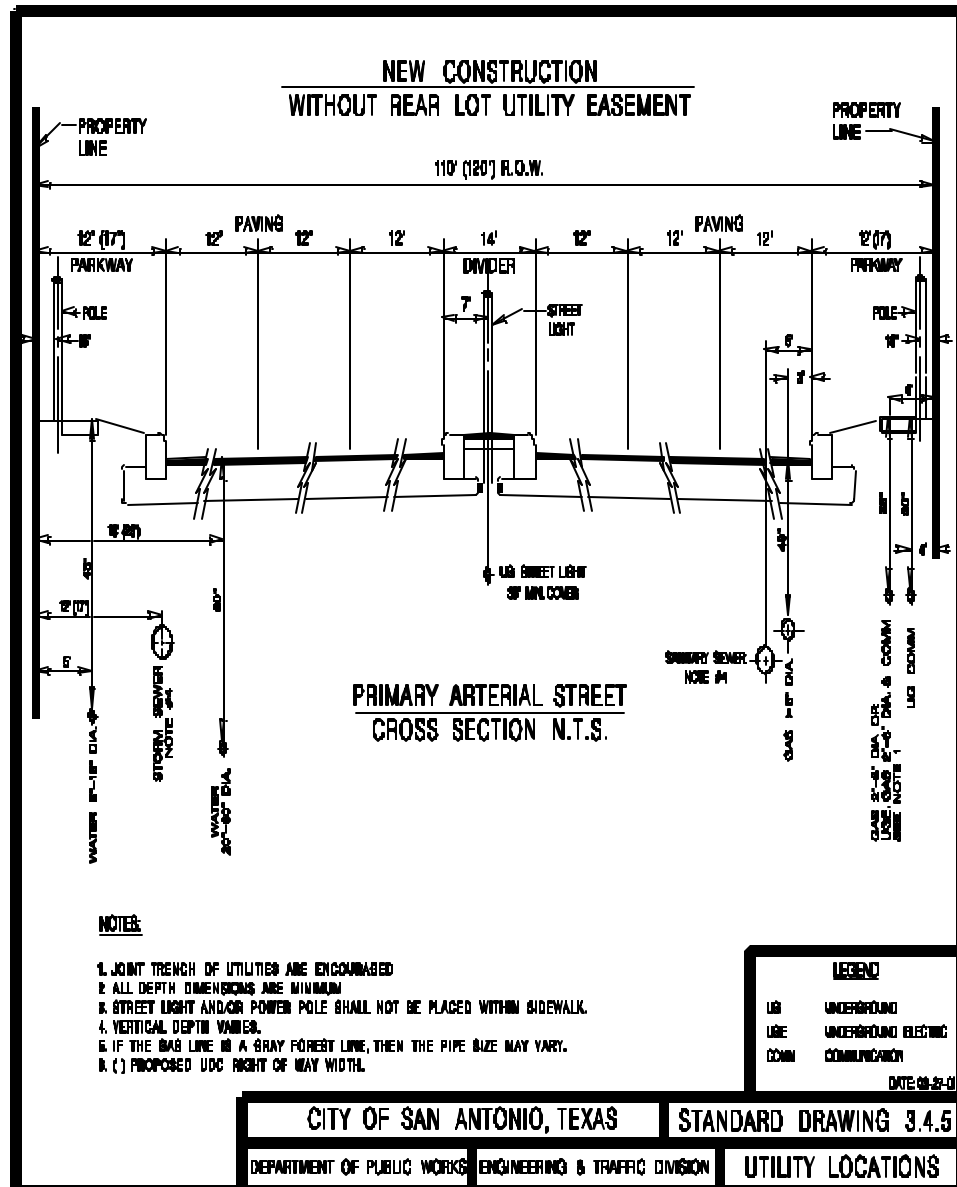
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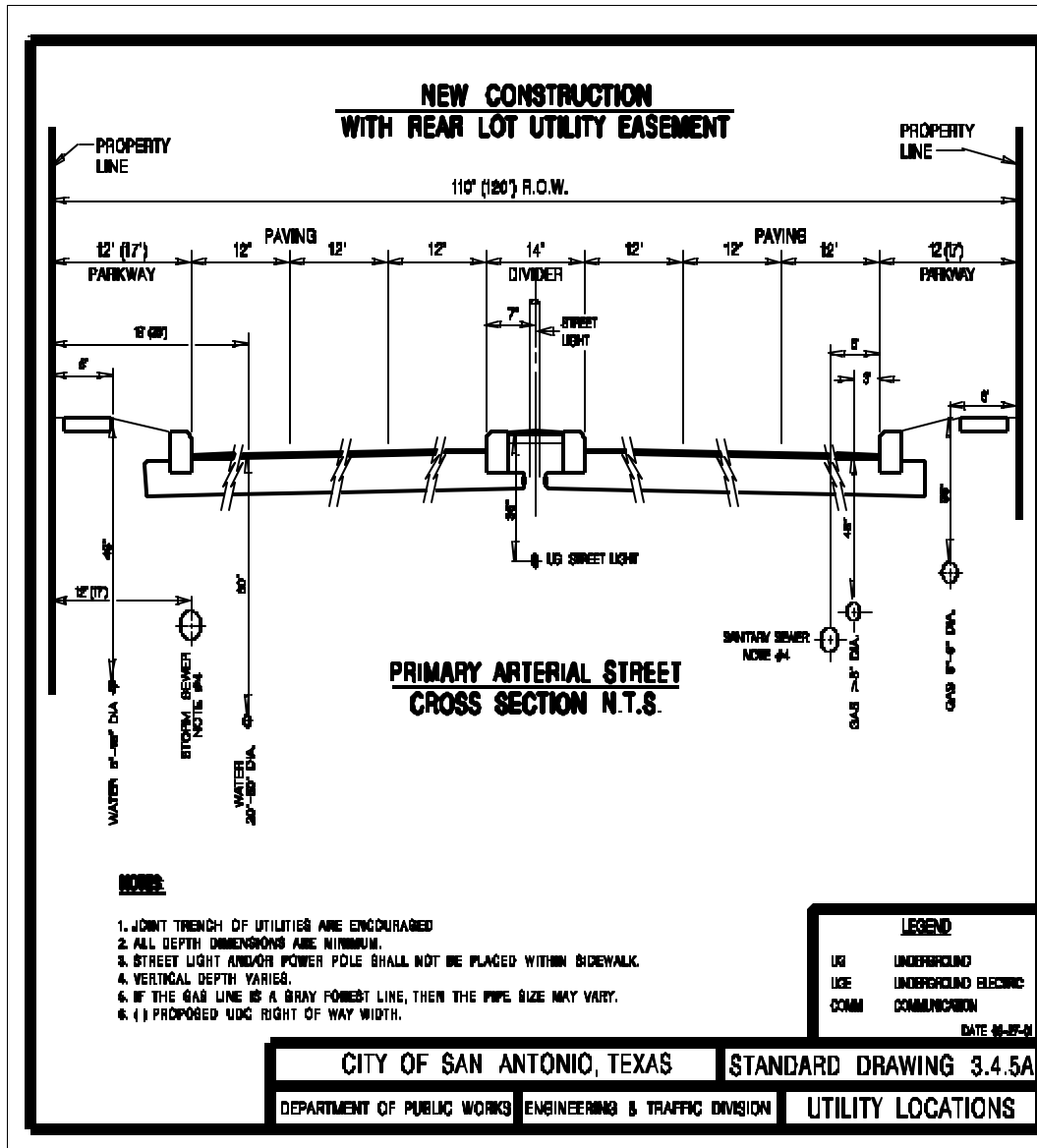
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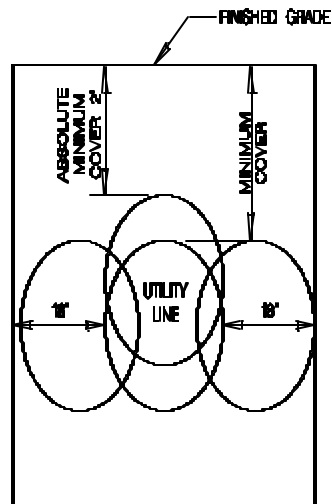
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CITY OF SAN ANTONIO, TEXAS		STANDARD DRAWING 3.4.3A
DEPARTMENT OF PUBLIC WORKS	ENGINEERING & TRAFFIC DIVISION	UTILITY LOCATIONS

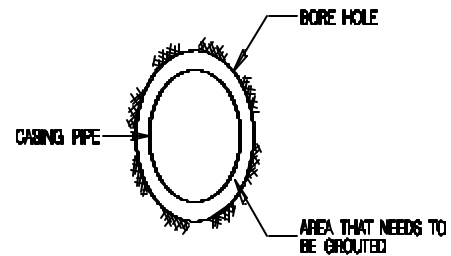








TRENCH ENVELOPE
N.T.S.



BORE DETAIL
N.T.S.

1. THE HORIZONTAL AND VERTICAL LOCATION OF ANY LINE, AS SHOWN ON THE STANDARD DRAWING 3.4.1 THROUGH 3.4.5A, MAY VARY AS ALLOWED UNDER TRENCH ENVELOPE, STANDARD DRAWING 3.4.6 AS LONG AS THERE IS NO CONFLICT WITH AN OTHER UTILITY LINE.

DATE 08-27-01

CITY OF SAN ANTONIO, TEXAS		STANDARD DRAWING 3.4.6
DEPARTMENT OF PUBLIC WORKS	ENGINEERING & TRAFFIC DIVISION	UTILITY LOCATIONS

Chapter 4

**UTILITY EXCAVATION
IN
RIGHT-OF-WAY**

UTILITY EXCAVATION IN RIGHT OF WAY

4.1.0 GENERAL

This section governs excavation practices in the public right-of-way within the city that is under the jurisdiction and control of the Department of Public Works or successor department (hereafter referred to as the Department of Public Works). This section outlines the procedures for obtaining permits for excavation, performing excavation, and restoration of the public right-of-way.

The office issuing the Utility Excavation Permit and performing the inspections is the Right-of-Way Management Section of the Department of Public Works for the City of San Antonio.

Detailed descriptions of the policy, procedures, specifications and standard details are included as part of the section or referenced in this section. These guidelines serve as a minimum standard for working in the public right-of-ways.

The following objectives must be adhered to as part of the requirements for working in the public right-of-way:

1. Maximize protection to the public and the work force.
2. Maintain the integrity of the facility already in place and other adjacent facilities.
3. Provide the ability to meet unusual emergency requirements when necessary in construction of the project.
4. Minimize the inconvenience to vehicular and pedestrian traffic as well as to the adjacent landowners.
5. Reduce the variations from the standard of utility assignments.
6. Minimize future maintenance costs to the City caused by the excavation.
7. Minimize time of street closure and interruption of the normal flow of traffic.

4.1.1 REFERENCES

- A. Refer to the list of references in Chapter 1, General Requirements.
- B. Texas Engineering Practices Act & Board Rules and Practices Procedure, latest revision.
- C. AASHTO – American Association of State Highway and Transportation Officials.
- D. ASTM – American Society for Testing and Materials.

4.1.2 DEFINITIONS

The following definitions apply in this chapter of the UECM. The terms, phrases, words, abbreviations, and their derivations shall have the same meanings herein. When not inconsistent with the context, words used in the present tense include the future; words in the plural number include the singular number, and words in the singular include the plural. The word “shall” is always mandatory and not merely permissive.

- (a) **BACKFILL** means excavation fill material that meets city specified quality requirements or the placement thereof.
- (b) **FIVE-YEAR CIP** means street improvements projects included in a Capital Improvement Projects by the City of San Antonio, Street Maintenance Program by the City of San Antonio.
- (c) **HOLE** means excavation in the public Right-of-Way with the excavation having a length less than the width of the pavement.
- (d) **TRENCH** means an excavation in the pavement with the excavation having a length equal to or greater than one-half (1/2) the width of the pavement.

4.1.3 OFFICE LOCATION AND WORKING HOURS

PERMIT OFFICE LOCATION:

City of San Antonio
Public Works Department
Right-of-Way Management Section
7402 S. New Braunfels Ave.,
San Antonio, TX 78223
Monday through Friday- 7:45 AM - 4:30 PM
Office (210) 359-3100 FAX (210) 359-3133
After hours, weekends and Holidays
Office (210) 207-8210 FAX (210) 337-4537

4.1.4 REGISTRATION

All right-of-way users must be registered with the Public Works Department. Registration shall be successfully performed on a one-time basis, prior to commencement of any work. Insurance, Performance/Assurance Bond and Sureties must be approved and on file with the City Clerk's Office, Public Works Department and Finance Department upon registration. A certification shall be provided to each applicant that successfully completes the registration process. Annual registration updates shall be performed on the anniversary of the initial registration certification. Refer to Chapter 29, Section 173 and 174 of the City Code.

4.1.5 SCHEDULING

Permittee shall call for inspection one hour prior to initiation of final restoration if classified as a permitted project receiving inspection. Work will be deemed unacceptable and/or temporary if the inspector does not have an opportunity to inspect before final restorations are started.

The Permit Holder shall make arrangements in advanced for inspections that are necessary "after working hours" and/or Saturdays, Sundays and holidays. Refer to Chapter 29, Section 29-168 (B).

4.1.6 QUALITY ASSURANCE

A. For projects which include conduits, duck banks or pipelines, have final design drawings sealed, signed and dated by the Professional Engineer responsible for development of the drawing.

4.2.0 PERMIT FOR EXCAVATION IN THE PUBLIC RIGHT-OF-WAY

Before excavating in a right-of-way a person or that person's agent shall obtain a permit under this division, except emergency operations. A person who obtains a permit is not required to obtain a temporary use of right-of-way permit. The expiration date shall be included in the permit. Except as provided by Chapter 29 Section 134 of the City Code, the permit term must comply with the time period required by the Utility Excavation Criteria Manual for excavation and/or blocking or closing the right-of-way. The Director may issue an extension of the permit, upon request. Permits shall be issued for CONTIGIOUS projects not to exceed the following spatial limits:

- A. One Street segment (block) in length or less;
- B. A string of Street segments (block) where the PCI's are equal to each other, when the project extends more than one (1) Street block;
- C. One paved Alley segment (block) in length;
- D. A string of Alley segments (block) where the PCI's are equal to each other, when the project extends more than one (1) Alley block;
- E. Point Source exploratory excavations (Pot-holes) shall be permitted individually;
- F. Capital Improvement Projects may be submitted with multiple locations on a single application, but will be segregated and issued separate permits based on the paved block (Street or Alley) PCI relative to scheduled dates;

- G. Non-Contiguous areas of work shall be permitted individually. This provision includes excavation and traffic control efforts (Street lane, Sidewalk and driveway closures with or without excavation involved), excavation in the parkway (including but not limited to non-conformance of alignment of power poles as outlined in Chapter 3, bore-pits and pot-holes), Non-Paved Alleys and Drainage Right of Ways.

4.2.1 EMERGENCY WORK

Person making the excavation must comply with the procedures prescribed in Chapter 29, Section 131 of the City Code and in this Manual in performing an emergency operation.

4.2.2 PROCEDURE FOR REQUESTING AN EXCAVATION PERMIT

The applicant may submit a request for a permit in person at the above office location during normal working hours or electronically if the applicant has an established electronic account with the Director s or that person's designee

An application must include:

- (1) The name, address, telephone, and facsimile telephone number, if any, of the applicant or applicant's agent;
- (2) An emergency telephone number at which the applicant or person who intends to excavate may be contacted on a 24-hour basis;
- (3) The proposed beginning and ending dates of the excavation;
- (4) A schedule for restoration of the excavated portion of the right-of-way;
- (5) The proposed area of excavation, method of excavation, and location, including street address, cross streets, or other applicable description of the excavation location;
- (6) Proof of insurance and Performance/Assurance Bond as required by Chapter 29 Sections 173 and 174 of the City Code;
- (7) Proof that the owner has a franchise, consent, license, or other legal right to install facilities in a right-of-way, if the proposed activity involves installation of a facility;
- (8) Proof that the applicant is registered under Chapter 29 Section 113 of the City Code, if applicable; and
- (9) a statement that the applicant has complied with applicable state and federal laws and regulations; and
- (10) any other information required by the Director to evaluate and process the application.

In reviewing an application for a permit, the Director shall consider the following:

- (1) the size of surface and subsurface area to be affected, considering the type of excavation the applicant proposes;
- (2) the period of time the applicant proposes to occupy the area;
- (3) the safety of the pedestrian and vehicular traffic in and adjacent to the occupied area; and
- (4) the vehicular and pedestrian traffic congestion and the vehicular parking requirements at the location.

4.2.3 DENIAL OF EXCAVATION PERMIT

A street cut permit can be denied or suspended for any of the reasons outlined in Section 29-124 of the City Code of the City of San Antonio:

4.2.4 REVOCATION OF EXCAVATION PERMIT

The Director may suspend or revoke a permit if the permit holder fails to correct any violation or the Director determines that the violation creates an immanent danger to health or safety.

4.2.5 APPEAL OF DENIED EXCAVATION PERMIT

Refer to Chapter 29, Section 122 of the City Code for appeal process.

4.3.0 PAVEMENT DEGRADATION RECOVERY FEE

4.3.1 GENERAL

Except as otherwise provided by law, the Director may place additional conditions on a permit issued under this section, including charging a Pavement Degradation Fee, as outlined in the City code of the City of San Antonio, are calculated in the manner additionally provided by this Manual. Except as otherwise provided by law, an applicant for a permit shall pay the permit fee and street damage restoration fee prescribed by separate ordinance.

Upon initial failure of the permitted site's Area of Influence, said permittee shall pay a Pavement Degradation Recovery Fee. The Pavement Degradation Recovery Fee shall be determined as outlined in Chapter 29, Section 168 (E) of the City Code. The Pavement Degradation Fee shall not be applied to streets scheduled for restoration or streets with a Pavement Condition Index (PCI) of less than 50, at the time of permit issuance.

4.3.2 OTHER APPLICABLE COSTS

The Right of Way User is responsible for cleaning up the area on or around the utility cut upon completion of work. In the event it is necessary for the CITY to clean up any area as a result of an Right of Way User's action, lack of action in a timely manner or negligence, the cost for this work will be billed to the Right of Way User at cost plus 10% Administrative Fee. This cost shall include, but not be limited to, labor (including overtime), equipment, fuel, material, supplies and contractual services necessary to complete the work..

4.4.0 EXCAVATION, JACKING, AND BORING IN THE PUBLIC RIGHT-OF-WAY

4.4.1 GENERAL

Excavation in any street not scheduled for reconstruction, paving, repaving or resurfacing should be kept to a minimum. The Permit Holder shall complete final pavement restoration of the excavated area within 4 weeks on major arterial, minor arterial and collector streets and within 4 weeks on residential and alley streets after final backfill is completed and accepted by the Director.

The Permit Holder shall conduct the work with a minimum disturbance of existing utilities and it shall be the responsibility of the Permit Holder to coordinate all work in or near the existing utilities with the Right of Way Users.

4.4.2 EXCAVATION IN NEW STREETS

Refer to Section 4.1.2 (q) for definition of New Street.

Excavation in new street should not occur without prior approval of the Director. If no options such as boring or laying lines outside the street are reasonable, excavation in new streets may be approved. To be considered, the request for a permit to excavate a new street must be accompanied with a description of the proposed work and proposed restoration of the area. The request shall also include a statement as to why alternate routes and/or procedures cannot be used in lieu of excavating a new street.

The work, if approved, shall be performed in accordance with the specifications of this section or referenced given in this section and/or as a special condition of the permit to excavate.

4.4.3 EXCAVATION IN PORTLAND CEMENT CONCRETE (PCC) PAVEMENT SURFACE

If the existing pavement is Portland Cement Concrete (PCC), the concrete shall be cut first with a saw to a minimum depth of half the thickness of the concrete. The concrete can then be broken out with an air chisel or pavement breaker. Care shall be taken so as not to break back more than 6" of PCC beneath the saw cut.

4.4.4 JACKING AND BORING

Where utilities are to be installed under a roadway by jacking or boring, the operation is to be inspected by the City. The following guidelines are identified for a Jacking and Boring (City of San Antonio Standard Specification Item No. 406) operation.

Construction operations will be conducted in such a manner that they will not weaken, impair or damage the existing roadway and infrastructure. The Permit Holder is responsible for determining the vertical and horizontal location of any facilities with the jacking or boring operation. Care must be taken not to damage other utilities.

The location of the boring pits shall be sufficient distance from the roadway to prevent undermining of the curb and gutter or shoulder. The City shall approve the location of the bore pit.

Bore pits shall be excavated to a depth sufficient to maintain a minimum depth of thirty-six inches (36") from the surface to the top of the bore. Water jetting types of boring equipment will not be permitted.

The jacking or boring shall be in accordance with the City of San Antonio Standard Specification Item 406, "Jacking or Boring Pipe". Clear space between the casing and the surrounding excavation shall be completely filled by pressure grouting the entire length of the installation.

The Permit Holder shall notify the Director at least one (1) hour prior to beginning the boring operations. Boring operation may proceed one (1) hour after notification if the inspector has not arrived.

The pits or trenches excavated to accomplish this operation shall be backfilled immediately after the work has been completed. The backfill shall be compacted to a density equal to the requirements of applicable specifications of the City of San Antonio Standard Specifications.

4.4.5 RESPONSIBILITY OF EXCAVATED AREA MAINTENANCE

A permit holder shall maintain repairs in the right-of-way. The Director may require a permit holder to enter a maintenance agreement for an appropriate period and provide a surety bond for maintenance of the repair, as prescribed in the Right of Way Management Ordinance.

4.4.6 SHORING AND STEEL PLATES

The excavation and shoring of all trenches shall be in accordance with the "Trench Excavation and Safety Protection" required by Item 550, "Trench Excavation and Safety Protection", Item 400, "Excavation, Trenching and Backfilling" and Item 551, "Special Shoring" of the City of San Antonio Standard Specifications for Construction.

If trenches are not permanently backfilled by the end of the working day, the permit holder shall temporarily backfill and plate the trench if the area is to be re-opened to traffic; the plates shall be secured by applying Hot Mix Asphaltic Concrete, Cold Laid around the perimeter of the plate and tack weld end to end sections in such a manner that would secure the plate from lateral movement; pinning of the plates with rebar or other object will not be allowed. At no time shall the plates be placed in such a manner that causes a traffic hazard to pedestrians, cyclists and other non-vehicular traffic. The City recommends that steel plates be used when necessary over any open trench to maintain a safe construction site. Traffic control devices shall be installed and maintained in accordance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

4.4.7 RESPONSIBILITY FOR SIGNS, BARRICADES AND WARNING DEVICES

The Right of Way User working in any public rights-of-way is responsible for the safe movement of traffic (pedestrian and/or vehicular) through the construction area. Right of Way User shall meet all requirements for barricading and traffic control as specified in the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

- A) Only those individuals who are qualified by means of adequate training in safe traffic control practices and have a basic understanding of the principles established by applicable standards and regulations, including those in TMUTCD, should place and maintain the traffic control devices in construction area.
- B) If the Right of Way User does not subcontract the barricading to a firm specializing in traffic control, then they must have a trained and qualified person(s) and must submit the qualifications and name(s) of employees to the Traffic Engineer for approval prior to the work commencing. They must also at this time submit for review a traffic control plan with all signs and barricades conforming to the requirements of TMUTCD.
- C) All barricades used by the Right of Way User shall be of the type, size and design specified by TMUTCD. If a firm specializing in traffic control does not supply traffic control devices, then devices must be inspected and approved by the Traffic Engineer.
- D) Flashing or steady burning amber lights as specified by the City of San Antonio Barricade and Construction Standards sheets (BC-89) and the TMUTCD are required on barricades.
- E) All traffic control devices must display accurate information describing the exact road situation.
- F) If the City Engineer finds non-compliance with the TMUTCD, he will notify the Right of Way User in writing of the violation. If the Right of Way User ignores the citation, then the Traffic Engineer will call a firm specializing in traffic control and place the necessary devices as required. The CITY will pay the charges but the Right of Way User must reimburse the CITY for all expenses plus \$500 for non-compliance. Failure to clear all charges will be sufficient grounds for denying the subsequent street cut permits.

All traffic control devices must be removed immediately upon completion of work.

Prior to commencement of utility excavation, construction or any work associated with a permitted project; the Right of Way User shall install, erect or mount the following signs:

- 1) 48" x 30" (min.) (TxDOT Standard Sign No. G20-6) Contractor's informational sign containing the (i) name of the Contractor; (ii) Contractor's emergency phone number(s); (iii) Right of Way User, and (iv) estimated completion date. Other information could be provided on the sign that would provide the general public

contractor related data. This sign shall be clearly displayed minimum one (1) per block. The sign shall be clearly displayed and maintained for the duration of the project.

- 2) 72" x 48" (min.) (TxDOT Standard Sign No. G20-8) Right of Way User informational sign containing the (i) name of the Right of Way User; (ii) Address; (iii) City; (iii) State; (iv) Right of Way User emergency phone number(s); and (iv) estimated start and completion dates. Other information could be provided on the sign that would provide the general public project related data. This sign shall be clearly displayed minimum one (1) per project (terminus end of project). The sign shall be clearly displayed and maintained for the duration of the project.

4.5.0 BACKFILL OF EXCAVATED AREA

4.5.1 GENERAL

Open Trenches may be temporarily backfilled for the convenience of the Permit Holder or for public safety. However, at least one (1) hour prior to beginning permanent backfill operations, the Permit Holder must notify the Director's Dispatcher of the time the backfill will begin. The Permit Holder will need the permit number and location of the street cut before calling the dispatcher to request an inspection. No backfill will be considered acceptable unless this call has been received and the Inspector has an opportunity to inspect the backfill operation. Permit Holder may commence backfill operations one (1) hour after notifying the Director's Dispatcher. Backfill made prior to the scheduled one (1) hour notice will be deemed unacceptable.

All excess water and mud shall be removed from the trench prior to backfilling. Any backfill placed during a rainy period or at other times, where excess water cannot be prevented from entering the trench, will be considered temporary and shall be removed as soon as weather permits. All disturbed base material or any base that has been undermined shall be removed and discarded. The new flexible base shall be the depth of the existing base but in no case less than twelve inches (12") thick.

4.5.2 BACKFILL SUPPORTING INFRASTRUCTURE

Backfill shall start with bedding of granular material per utility requirements followed with selected materials from excavation or borrow. Material used in backfill shall be soil material that is free of any appreciable amount of gravel or rock larger than four inches (4") dimension.

Backfill, which will support any portion of any sidewalk, driveway or roadway, shall be placed in uniform layers not to exceed six inches (6") in depth (loose measurement). Each layer shall be compacted to not less than ninety-five percent (95%) of the density as determined in accordance with Test Methods TEX-113-E and TEX-114-E. Each layer of backfill material shall be at the moisture content required to obtain the specified density and shall be compacted to that density by approved mechanical means. The use of wheel compactors will only be allowed with prior authorization from the Director. When wheel compactors are used, backfill lifts may be increased to twelve inches (12") provided proper moisture content of the backfill material is maintained and the specified minimum density is achieved.

Testing may be required to validate that adequate compaction is being achieved. All testing will be at the expense of the Permit Holder. If the backfill does not meet the density requirements, the backfill will be considered unacceptable and shall be removed and replaced at the expense of the Permit Holder.

The use of flooding as a means of obtaining compaction of back fill shall not be allowed.

4.5.3 BACKFILL NOT SUPPORTING INFRASTRUCTURE

All exposed areas, which will not support any portion of a sidewalk, driveway or roadway, shall be restored to original condition or better prior to excavation.

4.5.4 UTILITY ADJUSTMENTS FOR CAPITAL IMPROVEMENT PROJECTS

Utility adjustments for a Capital Improvement Project (CIP) shall be performed in advance of the project unless arrangements are made with the Director.

The Permit Holder shall call the City's dispatcher one-hour prior to initiation of backfill operations. The Permit Holder will perform all repair requirements as specified in this manual up to the finish base. Cold mix asphalt concrete (TxDOT Specification Item 334, "Hot Mix-Cold Laid Asphalt Concrete Pavement") may be used in lieu of hot mix asphalt concrete (Standard Specification Item No. 205) over the finish base.

The Permit Holder shall be required to maintain the trench until a work order is issued authorizing the CIP construction to commence.

4.6.0 RESTORATION OF EXCAVATED AREA

Except as otherwise provided by law, a person who excavates a street, sidewalk or driveway shall pay the city's cost to inspect and restore the pavement.

On completion of a permitted activity, a permit holder shall restore and maintain the right-of-way to its original condition in accordance with the procedures and time period prescribed in the Utility Excavation Criteria Manual, as determined by the Director.

Upon inspection, the Director may cause for the completion and restoration of the permitted work area. This work shall be billed to the Right of Way User, or apply the security, for the entire cost, if the permit holder does not finish the excavation within four weeks after the Director makes a final inspection.

If the Director revokes a permit under Section 4.2.4, the permit holder shall immediately restore the affected areas to their original condition. The permit holder must complete the restoration within 24 hours after the revocation and shall remove equipment, persons, materials, and debris from the right-of-way. The permit holder shall restore the area in compliance with the procedures contained in the Utility Excavation Criteria Manual.

If the Director determines that the owner has not restored the right-of-way as required by this Manual or that the restoration is not complete, the Director may restore the area to the condition that existed before the permitted activity. The City may recover from the permit holder and the owner, jointly and severally, the actual expenses incurred in the restoration including, the cost of labor, materials, overhead, rental of equipment used in restoring the site, \$500 penalty and attorney's fees. The City may institute procedures to forfeit bonds or other security furnished in connection with the permit.

4.6.1 GENERAL

The following requirements shall govern the restoration of street and alley pavements and easements in the City of San Antonio. On a CIP project, if there is a conflict between the following requirements and the CIP Plans and Project Manual, the Plans and Project Manual for the CIP project shall govern.

4.6.2 PERMANENT PAVEMENT REPAIRS

All permanent pavement repairs shall be made under one of the two following methods.

4.6.2.1 PERMANENT PAVEMENT REPAIRS BY CITY

If the City is to make the permanent pavement repairs, the Permit Holder shall

maintain the excavated area for a period of two (2) weeks after acceptance by the Director. After the two-week period, the City will be responsible for maintaining the excavated area until final restoration is made. Backfill failures are still the responsibility of the Permit Holder. The Permit Holder shall reimburse the CITY for all costs incurred plus 10% Administrative Fee.

4.6.2.2 PERMANENT PAVEMENT REPAIRS BY PERMIT HOLDER

If the Permit Holder is authorized to make permanent pavement repairs, the Permit Holder will maintain the excavated area until permanent pavement restoration of the excavated area is complete. The Permit Holder shall make final repairs within four (4) weeks on arterial and collector streets and within four (4) weeks on residential, local and alley streets after the Director makes final backfill inspection. Backfill failures are still the responsibility of the Permit Holder.

4.6.3 EXCAVATION UNDER CURB OR CURB AND GUTTER

If the excavation occurred under the existing curb and gutter and undermines more than four feet (4') of curb line, the undermined curb and gutter shall be removed and replaced to the nearest joints on each side of the cut.

If the excavation occurred under machine laid curb (not an integral curb and gutter) and has no joints, the curb shall be removed two (2') feet back from the excavation wall on each side but no less than a total of eight (8') feet.

If the curb or curb and gutter is undermined less than four feet (4'), Class "G" concrete (Standard Specification Item 300.5) or Controlled Low Strength Material (CLSM) may be used as backfill and bedding under the curb.

The Class "J" Concrete or CLSM shall be placed over the bedding material encasing the utility line and shall extend a minimum of six inches (6") in the back and in front of the curb or curb and gutter and a minimum of one inch (1") above the bottom of the curb or curb and gutter and two inches (2") below the proposed pavement.

The placement of the concrete or CLSM shall insure that all undermined areas will rest on the concrete or CLSM free of voids. There shall be a minimum of twelve inches (12") of Class "J" Concrete or CLSM under the bottom of the existing curb or curb and gutter.

All curb or curb and gutter with visible signs of damage or movement shall be removed and replaced. Concrete and CLSM used shall be in accordance with City of San Antonio Standard Specifications.

4.6.4 EXCAVATION UNDER SIDEWALK

If the excavation occurred under an existing sidewalk, the sidewalk shall be removed back to the nearest expansion or dummy joint beyond the trench wall and replaced after the work is completed. Concrete used shall be in accordance with City of San Antonio Standard Specifications for sidewalks (Standard Specification Item 502, "Concrete Sidewalks").

4.6.5 REPAIRS OF SIDEWALKS WITH PAVERS AND/OR BRICKS

Some pavers/bricks have been installed on a sand or fine granular aggregate cushion, while others may have been adhered to the base with mortar, epoxy, etc. The following procedure will apply if a street, median or sidewalk surfaced with exposed paver blocks or bricks is excavated:

- A. Supported on a Sand or Fine Granular Aggregate Cushion. The pavers/bricks, which form the boundaries to the proposed excavation, must be held in its position by restrainers in accordance with this procedure and Standard Drawing

No. 4.9. The number and length of restrainers will depend on the pavers/bricks that are not locked in place. The restrainers shall be removed upon replacement of the pavers/bricks.

- B. Supported on other than on a Sand Cushion. Standard Drawing No. 4.9 shall be applicable except that the angle iron restrainers are not required.

The pavers/bricks shall be removed individually by hand and salvaged for reuse. The bricks shall be removed in a careful manner to insure that the pavers/bricks are not damaged. Removal of pavers/bricks by heavy equipment will not be permitted. The pavers/bricks shall be stored and reused in the cut area.

The Permit Holder will be responsible for all damage to the existing pavers/bricks. Any pavers/bricks that are damaged and/or broken by the Permit Holder shall be replaced at Permit Holder's expense with similar material approved by the Street Maintenance Division of the Department of Public Works.

Any base material (flexible, asphalt and/or concrete) under the pavers/bricks shall be saw cut half way through and removed to the top of the subgrade.

Upon completion of the backfilling of the trench, the pavers/bricks shall be laid using the same procedure (sand or fine aggregate cushion or adhered to base) as for the original installation and as close to the original position, material and pattern as possible.

Pavers/bricks set in sand shall be set with a vibratory plate compactor. Fine mortar sand shall be vibrated into all joints.

All repaired surfaces shall be smooth and true to established line, grade and cross-section of the surrounding surface. When tested with a 10-foot straightedge, any deviation in the repaired surface in excess of 1/8 inch shall be corrected.

All repairs to sidewalks, driveways and curb and gutter shall be true to both horizontal and vertical alignment to provide a neat and uniform appearance. Deviations from this will be considered as unacceptable work. Replacement will be at the Permit Holder's entire cost.

4.6.6 REPAIRS IN STREETS OR SIDEWALKS WITH PAVERS AND/OR BRICKS IN TRI-PARTY AREA

A utility owning a facility within a brick surfaced street (Tri-Party Area) should first determine that it is essential to disturb such surface. A thorough evaluation should be made to utilize other procedures to avoid the removal of bricks. The removal and replacement of bricks requires a unique and skilled treatment.

If a brick surfaced street must be cut, then the trenching procedure must be performed accordingly:

1. The bricks must be removed individually by hand and salvaged for reuse. The Right of Way User shall remove the bricks in a careful manner to insure the bricks are not damaged. Removal of bricks by equipment will not be permitted. The bricks must be delivered to the Public Works Department, Northwest Service Center, located at 6802 Culebra Rd. 680-3607 or 680-3826.
2. The exposed outline of bricks, which are the outside boundaries for the trench, must be held in its position by restrainers. The number and length of restrainers will depend on the bricks that are not locked in place (Standard Drawing No. 4.3).

3. The brick surfaced streets are supported by asphalt stabilized base. This base must be cut by a rock or concrete saw to the bottom of the base or to the top of the subgrade.
4. When excavating with a backhoe, rubber or wood must be placed on the bricks to support the bucket and the stabilizers. Special precaution should also be taken when using track equipment.
5. The Right of Way User must restore the trench up to but excluding the brick pavers. Public Works Department will replace the pavers Standard Drawing No. 4.3) If immediate traffic is necessary onto the trench, then the Right of Way User may place Hot Mix/Cold Laid Type "D" Asphalt in place of the bricks for the riding surface. When notified by the Right of Way User, Public Works Department will remove the asphalt and replace the brick pavers.

All cost incurred by Public Works Department in the restitution of the trench will be charged back to the Right of Way User, as per CITY Code.

4.6.7 CURB AND GUTTER

Replacement curb and gutter will be set true to grade. The replacement curb and gutter shall be Class "A" concrete (Standard Specification Item No. 300.1) with finish mortar to be applied within one (1) hour of placement of the concrete. The curb and gutter shall be placed on a minimum of four inches (4") of compacted base. It shall be formed with "mules" and "S" trowels. Expansion joints, 1/2 inch wide expansion joint material, shall be placed at intervals not to exceed forty feet (40'). Weakened plane joints shall be made 3/4 inch deep and placed at ten-foot (10') intervals. The edges of all joints shall have a 1/4 inch radius. All replacement curb or curb and gutter shall be constructed to the nearest expansion or dummy joint of the existing curb and gutter. If removed to a weakened plane joint, two 24 inch smooth dowels, 1/2 inch in diameter shall be inserted a minimum of 12 inches into the existing curb. A minimum of one (1) inch gap shall be provided at the end of the drilled hole.

4.6.8 SIDEWALKS

Replacement sidewalks shall be Class "A" Concrete (Standard Specification Item No. 300.1) matching the existing thickness but with a minimum thickness of four inches (4") in residential areas and five inches (5") in commercial areas. The concrete shall be placed on a two-inch (2") sand cushion, except that the width and location shall match the existing sidewalk. All sidewalk replacement shall be extended to the nearest expansion or dummy joint of the existing sidewalk. Expansion joint material, that is 3/4 inch in thickness and conforms with Standard Specification Item No. 304, shall be placed at a distance not to exceed forty (40') between joints and passing through the entire thickness of the concrete being placed. Weakened plane joints shall be made 3/4 inch deep and placed at five feet (5') intervals. The edges of all joints shall have a 1/4 inch radius. The concrete shall receive a broom finish unless the surface is to match an existing exposed aggregate surface.

Reinforcement shall match the existing, but in no case shall it be less than one layer of 6X6 – welded-wire fabric or equivalent. It shall be supported such that it will be at the mid-depth of the slab. During the placement of concrete, care shall be taken that the reinforcement remains at this position. If the replacement sidewalk is matching an existing sidewalk at a weakened plane joint, then the reinforcement shall be lapped a minimum of six inches (6").

Concrete for sidewalks will be placed as soon as practical after the utility had been placed. Sides of sidewalks shall be backfilled immediately after forms are removed.

When a sidewalk is being replaced within the radius of a curb return at an intersection, a sidewalk Pedestrian Ramp will be installed.

4.7.0 PAVEMENT REPAIRS

4.7.1 GENERAL

The following requirements shall govern the replacement of the pavement structure whether the work is to be done by the Permit Holder or the City.

The Permit Holder must notify the Director's Dispatcher at least one (1) hour prior to beginning the permanent pavement repair. If the Inspector has not arrived within one (1) hour of the notification, the pavement repairs may proceed and does not constitute an automatic approval of same.

4.7.2 SURFACE PREPARATION

When the Permit Holder is performing only temporary surfacing – The backfill will be topped with a minimum compacted thickness of two inches (2") of hot mix-laid or hot mix-cold laid asphalt concrete.

When a Permit Holder is to provide the final surfacing – the backfill shall be topped with a minimum thickness of 2 inch (2") Type "D" HMAC Mix for local/residence streets or a minimum thickness of 3 inch (3") Type "C" Modified HMAC Mix for collector/arterial streets.

All final pavement cuts shall be made with a saw to straight and uniform lines. Trench restoration shall include resurfacing to a constant width equal to the widest part of the excavation plus 12 inches (12") on each side. On longitudinal cuts a line parallel to the curb shall be used to mark the widest part of the excavation plus 12 inches (12"). A perpendicular line to the curb line plus 12 inches (12") at each end shall mark the length of the excavation.

On transverse cuts, the restoration area shall be a line perpendicular to the curb line and starting at a point of 12 inches (12") from the wall of the trench at the widest point.

Areas with widths of 24 inches (24") or less between the edge of the curb and the repair surface will also be removed.

All damage caused directly or indirectly to the street surface or subsurface outside the pavement cut area shall be regarded as a part of the street cut. This includes any holes drilled into the pavement and not properly plugged, or gouges caused by equipment. These areas, as established by the Director, shall be included in the total area repaired. All damage survey markers, or benchmarks within the excavation shall be replaced. All traffic devices damaged during the excavation shall be replaced as part of the restoration.

4.7.3 FLEXIBLE BASE WITH ASPHALT SURFACE

When existing pavement consists of flexible base with an asphalt surface, the permanent pavement repair shall be made in accordance with this procedure and Standard Drawing No. 4.4.

All disturbed based material or any base that has been undermined shall be removed and discarded. The new flexible base shall be the depth of the existing base but in no case less than twelve inches (12") thick. The new base shall be placed on the previously approved backfill in accordance with Standard Specification Item No. 200 "Flexible Base". The surface of the base layer shall be primed in accordance with

Standard Specification Item No. 202.

All exposed edges and surfaces shall be tack coated (Standard Specification Item No. 203) before placing the new asphalt concrete. The new asphalt concrete shall be placed and compacted flush with the existing surface at the thickness of the existing asphalt surface but in no case shall it be less than two inches (2") thick after compaction

4.7.4 ASPHALT OVERLAY ON PORTLAND CEMENT CONCRETE (PCC) SURFACE

When the existing pavement consists of PCC with an asphalt overlay surface, the permanent pavement repair shall be made in accordance with this procedure and Standard Drawing Nos. 4.5 (existing non-reinforced PCC) and 4.6 (existing reinforced PCC).

If the existing concrete base or pavement contains reinforcing steel, the existing concrete shall be cut with a saw six inches (6") beyond the edges of the cut and broken out without any damage to the reinforcing steel or remaining concrete. The depth of saw cut shall be at least $\frac{1}{2}$ the thickness of the concrete base. Replace reinforcing steel of the same size and Grade 40. Reinforcing steel shall be firmly tied to the existing steel with six-inch (6") laps. If the reinforcing steel is cut or broken off during this operation, the replacement steel shall be butt-welded by a certified welder.

All PCC shall be Class "A" (Standard Specification Item No. 300.1) and shall extend from two inches (2") below the existing PCC pavement to the asphalt surfacing but in no case shall it be less than seven inches (7") in thickness. The concrete shall be consolidated by vibration and receive a wood-float finish. The concrete may be rodded for small placements of concrete in lieu of vibrating. The concrete shall be cured for a minimum of seventy-two (72) hours, or as approved. Traffic shall not be allowed to cross the concrete during this 72-hour period.

After the PCC has cured and all the edges of the existing asphalt surfacing have been tack coated (Standard Specification Item No. 203), the new asphalt concrete shall be placed and compacted flush with the existing surface. The new asphalt surface (Standard Specification Item No. 205) shall be the thickness of the existing asphalt surface but in no case shall it be less than two inches (2") Type "D" HMA Mix for local/residential streets nor less than 3 inches (3") Type "C" HMA Mix for collector, minor arterial and major arterial streets.

4.7.5 FULL-DEPTH PORTLAND CEMENT CONCRETE (PCC) SURFACE

When the existing pavement consists of full-depth PCC construction, the section excavated shall be replaced from joint to joint. Follow the requirements of City of San Antonio Standard Specification Item No. 209 Concrete Pavement and Standard Specification Drawing Nos. 4.5 (existing non-reinforced PCC) and 4.6 (existing reinforced PCC).

If the existing concrete base or pavement contains reinforcing steel, the existing concrete shall be cut with a saw six inches (6") beyond the edges of the cut and broken out without any damage to the reinforcing steel or remaining concrete. The depth of saw cut shall be at least $\frac{1}{2}$ the thickness of the concrete base. Replace reinforcing steel of the same size and Grade 40, min. Reinforcing steel shall be firmly tied to the existing steel with six-inch (6") laps, min. If the reinforcing steel is cut or broken off during this operation, the replacement steel shall be butt-welded by a certified welder.

The new PCC shall be Class "A" (Standard Specification Item No. 300.1) and shall extend from two inches (2") below the existing PCC to flush with the surface of the

existing concrete. In no case shall the new concrete be less than seven inches (7") in thickness. The concrete shall be consolidated by vibration and receive a wood-float finish. It shall be cured for a minimum of 72 hours. Traffic shall not be allowed on the concrete surface during this 72-hour period.

All disturbed base material and all asphalt concrete that has been undermined shall be removed and replaced with Class "A" Concrete (Standard Specification Item No. 300.1), to the depth of the asphalt concrete but in no case less than seven inches (7") thick. The PCC will be consolidated by vibration and receive a wood-float finish. The concrete shall be finished two inches (2") below the existing asphalt surface. The concrete shall be cured for a minimum of 72 hours or as allowed by the Director for quickset mixes. Membrane curing will not be allowed. Traffic shall not be allowed to cross the concrete during the curing period.

4.7.6 FULL-DEPTH ASPHALTIC CONCRETE PAVEMENT

When the existing pavement consist of "Full-Depth" asphaltic concrete, the permanent repair shall be made in accordance with this.

The existing full depth asphalt pavement shall be cut with a concrete saw a distance of twelve inches (12") beyond the edges of the trench wall and the resulting isolated asphaltic materials shall be broken and removed. The depth of the saw cut shall be at least ½ the thickness of the pavement thickness. The top two inches (2") for residential streets or three inches (3") for major arterial, minor arterial and collector streets of the full depth asphalt pavement layer shall then be sawed a distance of twelve inches (12") beyond the excavation walls and the ACP materials removed.

All disturbed sub-base and subgrade materials that have been undermined shall be removed and replaced with compacted backfill to the bottom of the existing full depth asphalt pavement section. The top surface of the compacted backfill shall be primed in accordance with Standard Specification Item No. 202. A tack coat (Standard Specification Item No. 203) shall then be applied to the exposed vertical edges and top of the primed surface.

The new roadway base structure shall consist of Hot Mix Asphaltic Concrete Type "A". The rate of application shall be designed by a Professional Engineer for repairs in excess of 100 square yards. Projects of 200 square yards or less may use the following rates of application: 5" for Residential/Local Streets; 7" for Collector Streets; 8" for Minor Arterial Streets and 9" for Major Arterial Streets.

The new asphalt surface (Standard Specification Item No. 205) shall be the thickness of the existing asphalt surface but in no case shall it be less than two inches (2") Type "D" HMAC Mix for local/residential streets and 3 inches (3") Type "C" modified HMAC Mix for collector/arterial streets. The asphalt concrete shall be compacted in accordance with Standard Specification Item No. 205.

4.7.7 REPAIR OF NEW STREETS

Narrow excavations (i.e. trench widths less than 8") shall be backfilled with Controlled Low Strength Material (Section 4.8.5) or Class "J" Portland cement PCC (Standard Specification Item No. 300.1) and finished with an asphaltic concrete surface layer (Standard Specification Item No. 205). Narrow cuts adjacent to existing Curb and Gutter shall be completed in accordance with this procedure, while narrow cuts along and across the roadway shall be completed in accordance with this procedure.

Excavations with trench widths greater than eight inches (8") shall be backfilled to the lower elevation of the existing base material with Flexible Base Item or Asphalt Treated

Base Item. Lime treated subgrade shall not be considered base material. The remaining areas shall be backfilled with a pavement structure equivalent to the existing pavement based on location of the cut. Cuts adjacent to existing Curb and Gutter shall be completed, while cuts along and across the roadway shall be completed in accordance with this procedure.

The designation of a Class "J" PCC is intended to identify the relative in-place strength of the desired material. Concrete mixes greater than a 2-sack mix will not be allowed in these applications.

If the excavation is transverse (crossing the street), the existing surface shall be saw cut a minimum of twelve inches (12") wider on each side of the trench wall and replaced with new equivalent surfacing.

Longitudinal excavation parallel to the curb and gutter shall require removal and replacement of the existing surface layer a minimum of the width of the trench plus twelve inches (12") on each side of the trench.

A narrow excavation that is parallel and adjacent to the curb and gutter shall be required to pave a minimum of twenty-four (24") from the lip of the gutter. Twelve inches (1") from the outer trench wall shall be maintained at all times. Adjustment and increase in the 24" minimum pavement patch may be required.

Factors such as proximity to the curb and gutter, other pavement cuts, etc., may require removal and replacement of an additional area of pavement. The Director may also require the replacement of a full lane to preserve the original condition of the street. If any portion of a trench repair in an asphaltic concrete pavement falls within a street intersection (i.e. from curb to curb return), then the entire quadrant of the existing surface layer shall be replaced, unless otherwise directed in writing by the Director. If the trench repair occurs within a PCC pavement, then the entire concrete slab from joint to joint and joint to edge shall be replaced, unless otherwise directed in writing by the Director.

All overlaid areas of the new streets and all streets in good condition shall be milled (Standard Specification Item No. 208) to provide a smooth transition.

A) Alternate Backfill Method

If "CLSM" and Class "J" concrete backfill materials are not available; the following backfill method may be used with prior approval of Director.

Flexible Base Material may be used as backfill. Replaced base material in the trench shall be twice the thickness of the original base but in not less than eighteen inches (18"), Base material shall be placed in a minimum of three equal lifts with material and compaction meeting specifications outlined in Standard Specification Item No. 200.

The thickness of the pavement shall be consistent with the existing surface but in no case shall it be less than two inches (2") for residential streets nor three inches (3") for collector, minor arterial and major arterial streets.

Backfill shall comply with Section 4.5.1 of this manual and City of San Antonio Standard Specification Item No. 400. A certified laboratory shall obtain density test for backfill material. All density tests shall be completed and approved on each layer prior to additional backfilling. A copy of all completed and approved density tests shall be furnished to City of San Antonio Public Works Department

within 30 days after completion of street repair. Permit holder is responsible for all associated cost with laboratory testing.

4.7.8 EXCAVATIONS PARALLEL AND NEAR TO THE CURB AND GUTTER

When the length of an excavation in an asphalt pavement surface parallels the curb and gutter has an area of 2 feet (2') or less between the existing and new pavement, the area shall be removed and replaced with new surface.

Narrow excavation parallel and adjacent to the curb and gutter shall be paved a minimum width of 24 inches (24") from the lip of the gutter. The utility line will be enveloped with pipe bedding material in conformance with Standard Specification Item No. 410, or approved pipe manufacturer bedding material recommended for the facility being installed. The remainder of the trench will be concrete capped to a depth below the lip of the gutter of 2" for residential streets or 3' for collector, minor arterial and major arterial streets. The surface shall be finished with an asphalt surface, Hot Mix - Hot Laid.

4.8.0 MATERIAL SPECIFICATION

4.8.1 GENERAL

All materials shall be described in this section and the City of San Antonio Standard Specification Items.

4.8.2 FLEXIBLE BASE

Flexible base shall meet the requirements of Item 200, "Flexible Base", of the City of San Antonio Standard Specifications. Before using alternate materials and/or methods, written approval shall be required. The Director shall review the request and if approved for use, shall issue a written statement.

4.8.3 PORTLAND CEMENT CONCRETE (PCC)

Concrete, unless otherwise stated, shall meet the requirements of Item 307, "Concrete for Structure," of the City of San Antonio Standard Specifications for Class "A" concrete.

The slump shall not exceed four inches (4"). Maximum time intervals from initial batching of the mix to the placement of concrete, as well as ambient temperature restrictions at the time of placement shall meet the requirements of Section 307, "Concrete Structures". Membrane curing or other approved methods shall be used to cure all concrete. Membrane curing shall not be permitted on a surface on which tack coat or asphalt concrete will be placed. Traffic shall not be allowed on new concrete of a minimum of seventy-two (72) hours.

Hand mixing of concrete shall be permitted only for small placements of under one (1) cubic yard or in case of an emergency. Hand mixed batches shall be proportioned with one (1) part cement to three (3) parts aggregate mixture by volume, and enough water to provide not more than a four inch (4") slump. Aggregate mixture shall consist of approximately two-(2) parts gravel to one (1) part sand by volume.

4.8.4 ASPHALTIC CONCRETE PAVEMENT (ACP)

Asphaltic concrete shall meet the requirements of Item 205, "Hot Mix Asphalt Concrete Pavement", Type "C" modified or "D" of the City of San Antonio Standard Specifications unless another type is specified, and to a depth shown on the Drawings but not less than two inches (2") for residential streets or three inches (3") for collector, minor arterial and major arterial streets. The asphalt concrete shall have a temperature of not less than 200° F degrees when placed. It shall not be placed on ice, moisture or a frozen base.

Before placement of asphaltic concrete, all exposed surfaces shall receive a tack coat in accordance with Item No. 203, "Tack Coat", of the City of San Antonio Standard

Specifications. The asphalt concrete shall be compacted flush with the existing surface to an in-place density of not less than 92% of maximum theoretical density.

Street excavations with a width of ten feet (10') or more will require the base to be primed in accordance with Items 202, "Prime Coat", of the City of San Antonio Standard Specifications. The asphalt concrete shall be placed with an approved heater-screeded lay-down machine unless otherwise approved by the Director.

4.8.5 CONTROLLED LOW STRENGTH MATERIAL (FLOWABLE FILL)

This specification identifies the basic requirements for furnishing, mixing and transporting Controlled Low Strength Material (Flowable Fill). Flowable Fill is a low strength concrete material suitable as a backfill for utility trenches, abandoned pipes, manholes and valves. It is a heavy material and will exert a high fluid pressure against any forms, embankment or wall used to contain the Flowable Fill.

Materials shall conform to:

Cement	ASTM C150
Fly Ash	ASTM C618, Class "C" or Class "F"
Water	ASTM C94
Fine Aggregates	Natural or manufactured sand or combinations thereof, free from injurious amounts of salt, alkali, vegetable matter or other objectionable material. It is intended that the fine aggregate be fine enough to stay in suspension in the mortar to the extent required for proper flow. The fine aggregate shall conform to the following gradation:
SIEVE SIZE	%PASSING
3/4 inch	100
No. 200	0-10

If a flowable mixture cannot be produced, the sand may be rejected.

Admixtures - ASTM C260 and/or C494

Mix Design - The 28-day unconfined compressive strength must be less than 1,000 PSI, while three (3) day strength must exceed 25 PSI. The quantities of dry material per cubic yard are as follows:

WITH FLY ASH:		WITHOUT FLY ASH:	
Cement	50 lbs.	Cement	141 lbs.
Fly Ash	250 lbs.	Fine Aggregate	2,800 lbs.
Fine Aggregate	2,910 lbs.	Water	49.9 gals.
Water	60 gals.		

Consistency shall be tested by filling an open-ended three inch (3") diameter cylinder six inches (6") high to the top with flowable fill. The cylinder shall be immediately pulled straight up and the correct consistency of the flowable fill shall produce a minimum eight-inch (8") diameter circular-type spread with no segregation.

Batch, Mixing and Transportation – Materials are to be measured by weight and/or volumetric methods. The flowable fill may be mixed in a central concrete mixer, a ready

mix truck, or by other acceptable methods. The flowable fill shall be transported to the point of placement in a revolving drum mixer or in an agitator unit.

Placing - For pipe trench backfill, provide bulkheads at units of fill placement sufficient to confine backfill. Bulkheads are to be structural.

CLSM may be covered when it adequately supports the weight of construction equipment, no less than 24 hours after completion of placement.

4.9.0 MISCELLANEOUS REPAIRS

If the Director determines that the owner has not restored the right-of-way as required by this division or that the restoration is not complete, the Director may restore the area to the condition that existed before the permitted activity. The City may recover from the permit holder and the owner, jointly and severally, the actual expenses incurred in the restoration including, the cost of labor, materials, overhead, rental of equipment used in restoring the site, and attorney's fees. The City may institute procedures to forfeit bonds or other security furnished in connection with the permit.

4.9.1 EXCAVATION IN ALLEY

When asphalt surface with flexible base is encountered in an alley, specifications for Section 4.7.3, "Flexible Base with Asphalt Surface", shall be followed. When Portland cement (PCC) is encountered; Standard Specification Item No. 209, "Concrete Pavement" shall be followed. Where no flexible base exists, twelve-inch (12") minimum of flexible base shall be placed for the width of the trench plus six inches (6") from perimeter walls.

4.9.2 EXCAVATION IN DRIVEWAYS

When driveways are excavated on public rights-of-way, they shall be replaced "in-kind", i.e., an asphalt surface on a flexible base shall be replaced with similar materials to a similar depth. Any asphalt surface replaced shall be at least two inches (2") of asphalt concrete. A Portland cement concrete drive shall be replaced with Class "A" concrete (Standard Specification Item No. 300.1) to a similar depth as existing except that in no case shall it be less than five inches (5") on a two inch (2") sand cushion. Any curbing on the driveway that was damaged shall be replaced.

4.9.3 MANHOLES AND PULL BOXES

Permanent pavement repairs around manholes pull boxes, or similar structures shall be in accordance with Standard Drawing No. 4.5 for (Standard Specification Item No. 403) manhole and Standard Drawing No. 4.8 (Standard Specification Item No. 603) for Pull Boxes. The new pavement structure shall match the existing except that concrete base shall be at least seven-inch (7") thick. Asphalt stabilized base shall be at least eight inches (8"). Flexible base shall be at least twelve inches (12") thick. Hot mix asphalt concrete pavement shall be at least two inches (2") thick.

4.9.4 TRAFFIC SIGNALS

Whenever any excavation is to be performed within five-hundred 500 feet of a signalized intersection, approval from Traffic Operations must be obtained prior to commencing the work, 207-7765. The approval will be in the form of an agreement signed by the applicant and the Traffic Operation's representative on a form depicting the intersection layout and traffic control utilities (loops, stub-outs, pull-boxes, conduits, etc.) that will be affected by the planned excavation.

The applicant must notify Traffic Operations no less than seventy-two (72) hours prior to commencing the work. The notification should include specific information pertaining to location, scope and duration of planned excavation.

The Traffic Operations will subsequently determine if a joint meeting between the applicant, and a Traffic Operation's representative is needed to be held at the job site, wherein the Traffic Operations will locate the existing traffic control utilities which may be affected by the scope of the planned work. The Traffic Operations will, subsequently, depict the located utilities on the back of a work order. Both parties must sign this work order.

Forty-eight (48) hours prior to start of work, the applicant must notify Traffic Operations to modify or adjust the programming parameters controlling the traffic signal operation if deemed necessary by Traffic Operations.

The applicant is responsible to repair or replace at their own expense and to the satisfaction of the Traffic Engineer, any damage to the traffic control resources including but not limited to vehicle loops, home-runs, stub-outs, conduits, risers and cabinet. The Right of Way User must hire a firm specializing in the installation of traffic signals and have the signal restored to its original operational function. All materials, labor and procedure must be according to the specifications of the City's Traffic Engineering.

The applicant is responsible for all liability for personal injury and/or property damage which may be caused as a result of the incurred damages should the applicant fail to notify the Traffic Operations prior to start of work to request the Traffic Operations to modify or adjust the programming parameters controlling the traffic signal operation if deemed necessary.

Should the proposed scope of work conflict with the existing traffic resources (signals, signs, markings), the Right of Way User is responsible to identify and implement any and all temporary measures (outside the controller box) required to continue traffic control operations during construction in accordance with City's Traffic Engineering and MUTCD guidelines. These measures as well as the traffic management plan are to be approved by the City's Traffic Engineering Division.

If the Right of Way User ignores the restitution of the signal, then the Traffic Engineer will make the correction. The Right of Way User must reimburse the City of all costs incurred including 10% Administrative Fee plus \$500 penalty per day per Occurrence for non-compliance. Failure to clear all charges will be sufficient grounds for denying the next requested permit.

4.9.5 TRAFFIC MARKINGS

Traffic markings that were removed or damaged during the trenching or trench restoration processes, must be replaced with the same product that is existing on the road.

The markings must be replaced immediately after the trench is completely restored. The Right of Way User must hire a firm specializing in the application of traffic markings and all materials, labor and procedure must be according to the specifications of City's Traffic Engineering. The Right of Way User is responsible for all costs.

If the Right of Way User ignores having the traffic marking replaced, then Traffic Engineer will have the missing or damaged markings replaced. The Right of Way User must reimburse the City for all incurred costs including 10% Administrative Fee plus \$500 per day per occurrence penalty for non-compliance. Failure to clear all charges will be sufficient grounds for denying the next requested permit.

4.9.6 MONITORING WELLS

All parties requesting access from the City of San Antonio to install temporary monitoring wells for the purpose of assessing water quality, determining environmental impacts, etc. on City Right-of-Way shall first obtain a utility excavation permit from the Department of

Public Works. All requests to install temporary monitoring wells on City Right-of-Way shall be submitted to the Public Works Department with the following:

Utility Excavation Permit Application (Installation and Removal)

- a. Certificates of insurance from consultant's and/or drilling contractors as prescribed in Sec. 29-172-178, inclusive of the City Code of the City of San Antonio.
- b. A site location map and plan showing locations(s) of proposed monitoring wells, in accordance with Sec. 29-110 of the City Code of the City of San Antonio.
- c. A typical well construction diagram standard drawing No. 4.11 indicating the design of the well(s) and depth shall be completed in its entirety and submitted at time of application.
- d. Boring logs, sample results, chain of custody and sample locations for all samples collected in the monitoring wells, within a reasonable time after drilling the monitoring wells.

All monitoring wells shall be installed by a State of Texas licensed water well driller, and all applicable federal, state and local regulations. All monitoring wells shall be removed by the applicant upon termination of monitoring activities. A water well plugging report shall be submitted to the Public Works Director upon completion of removal. The City of San Antonio shall not, in any way, be held liable for any damages caused by the installation, use of, or removal of these wells. Any questions regarding temporary monitoring well installation requirements can be directed to the Environmental Services Division at 210-207-8987.

4.9.7 FIRE HYDRANTS

Each excavation shall be performed so it does not obstruct emergency access to any fire hydrant or public water supply valve.

4.9.8 AS-BUILT DRAWINGS AND SPECIFICATIONS

Upon final completion of an excavation, the permittee shall provide the ROW Manager a set of as-built drawings and specifications for the excavation when the Horizontal and/or Vertical permitted alignment deviates more than 1.5 feet AND/OR a major deviation in materials used in the trench backfill and restoration. In the event that the work was performed in accordance with the permitted alignment - the permittee may forfeit the requirement to submit As-Built Drawings by advising the ROW Manager in writing. The previously supplied drawings and specifications will be regarded as the as-built drawings and specifications.

The ROW Manager shall initially review each as-built submittal to determine whether it is complete. The ROW Manager shall return an incomplete as-built submittal with an explanation of the deficiencies. A complete as-built submittal shall become effective as a permit on the 14th day after the complete as-built submittal is received by the ROW Manager, unless the owner is notified that the permit has been disapproved.

The ROW Manager shall disapprove the as-built submittal if he determines that he conditions of this action are not satisfied. If a as-built submittal is disapproved, the ROW Manager shall notify the owner of the grounds for denial.

4.9.9 BILLING PROCEDURES AND FEES

Fees will be charged as provided in the City Code and/or Fee Ordinance and shall be updated annually.

4.10.0 TRAFFIC CONTROL PLANS

A Traffic Control Plan (TCP) shall be submitted with any Permit application for all proposed work

that is to be conducted on a roadway that appears on the City's Major Thoroughfare and Freeway Plan or is otherwise identified by the City's Traffic Engineer as having substantial traffic. The TCP shall describe the method by which vehicular and pedestrian traffic will be controlled during the Excavation process. For emergency excavations performed under Division 4, General Permits, no TCP will be required, but all signs, barricades and other necessary Traffic-control Devices shall be installed in accordance with the Texas Manual on Uniform Traffic Control Devices. - A TCP typically may not be required for work on a residential street, but all signs, barricades and other necessary Traffic-control Devices shall be installed in accordance with the Texas Manual on Uniform Traffic Control Devices.

- A. Specific anticipated construction dates and work hours must be included as part of the TCP. The City's Traffic Engineer may specify the exact dates and times of day under which construction activity may occur and specify any street or lane closures that are permitted upon the face of the approved Permit. Utilization of uniformed police officers may be required as part of the approved Permit and TCP to effectively manage traffic operations.
 1. Traffic Flow During Peak Hours. No work that would interfere with the traffic flow shall be conducted during peak hours on a roadway that appears on the City's Major Thoroughfare and Freeway Plan or on any other roadway that is identified by the City Traffic Engineer as having substantial traffic flow during peak hours. Typically, peak hours are from 6:00 a.m. to 9:00 a.m. and from 3:30 p.m. to 6:30 p.m., Monday through Friday. Hours and days may vary throughout various activity centers of the City.
 2. End of Day Lane Conditions. When work is stopped for the day, all lanes must be reopened to traffic, unless the City's Traffic Engineer has granted prior approval. A traffic lane shall be considered satisfactorily open if it meets the standards for the temporary surfaces in the Construction Requirements.
- B. If an excavation occurs in any public way that has been constructed, reconstructed, repaved or resurfaced in the preceding period of five years, as measured from the date of acceptance by the Public Works' Construction entity, inspection must be performed by a third party inspector or self-inspection by Permittee's staff who meet the Laboratory and Technician Qualifications Requirement contained in the Construction Requirements of these Rules and Regulations for material testing or experience requirements for inspectors that are contained in this section of the Rules and Regulations. Inspection and testing must be performed as defined in Frequency and Types of Tests of the Construction Requirements of these Rules and Regulations. Self-inspection by Permittee's staff will be allowed as long as the Permittee continues to demonstrate a history of performing satisfactory work. If the City Engineer determines that Permittee is performing work resulting in errors or failures, the City Engineer may notify the Permittee of this finding and following an opportunity for a hearing under Section 40-126 of these Rules and Regulations prohibit the Permittee from performing self inspections.
- C. If an excavation occurs in any public way that is greater than five years old as measured from the date of acceptance by the Public Works Construction entity, the Permittee must certify that restoration occurred in conformance with the City of San Antonio Design and Construction Standards.
- D. Persons who wish to be approved as third party inspectors for purposes of the Ordinance shall make application to the Right of Way Management Section of the Public Works Department at 7402 S. New Braunfels, San Antonio, Texas, or such other place as may be specified by the Director. The application shall be

filed on a form promulgated by the Director and shall provide evidence that the Applicant has at least 18 months' relevant education or training beyond the high school level, has at least two years' active and practical experience as an inspector of Excavations or equivalent work and can read and write any required reports in the English language. Any third party inspection applicant who is denied shall be afforded notice of the grounds and an opportunity for a hearing under the provisions of the Ordinance and these rules. Upon receipt of credible information that an approved third party inspector has failed to perform any material obligation under or has violated any provision of the Ordinance or these Rules, or any applicable law, or that the person otherwise is no longer qualified or fit to be included on the list of approved inspectors, the City Engineer may notify the inspector of the grounds, and following an opportunity for a hearing under the provisions of the Ordinance and these rules, remove the person from the list. No Owner shall engage any third party inspector nor shall any third party inspector accept any engagement under the Ordinance or these Rules if the third party inspector or a firm with which the third inspector is employed has any other contractual relationship with the Permittee relating to the performance of the Excavation other than for the performance of the Inspections. A current list of approved third party inspectors may be obtained from the City of San Antonio Internet Website. Inspectors shall maintain their records of Inspections at a location within the City of San Antonio and shall make the records available to the City Engineer for review or copying during regular City work hours upon 24 hours' prior notice.

4.11.0 TESTING

A. Description

The Permittee shall material testing for each phase of the work at no cost to the City.

B. Laboratory and Technician Qualification Requirements

Laboratories shall have current accreditation by the American Association for Laboratory Accreditation (A2LA). Material tests shall be taken by technicians with current certification as follows.

1. Soil and aggregates: National Institute for Certification in Engineering technologies (NICET) Level 11
2. Portland Cement Concrete: (NICET) Level 11 or American Concrete Institute (ACI) Level 1
3. Asphalt Concrete: (NICET) Level II or Texas Department of Transportation TxDOT Level 1A (Plant Inspection), Level 1B (Field Inspection)

C. Frequency and Types of Tests

The following testing frequencies shall be followed. The number of tests required may be adjusted for large projects when different frequencies are provided in individual standard specification section if approved by the City Engineer,

1. Minimum Horizontal Frequencies for Density Tests:
 - a. Utility Trench-One test per 100 linear feet per lift for each utility trench.
 - b. Utility Hole, Manhole, or Valve Box-One test per lift.
2. Construction Activities Tests:
 - a. Backfill-One test for every 2 vertical feet and 100 linear feet or fraction thereof, with at least one test per lift,
 - b. Cement Stabilized Sand-Testing as directed by City Engineer.
 - c. Concrete Pavement, Curbs, Gutters, and Sidewalks-Four compressive test specimens per each 100 cubic yards or portion thereof.
 - d. Asphalt Concrete Pavement:
 1. Asphalt Content-One test per 500 tons or fraction thereof of mix produced with a minimum of one test per day's placement.
 2. Aggregate Gradation-One test per 500 tons or fraction thereof of mix produced with a minimum of one test per day's placement.

3. In-Place Density-One test per 500 tons or fraction thereof of mix placed with minimum of one test per day's placement.
- D. Base Course Materials: - One test per 400 lane feet with no fewer than 2 tests per Excavation.
 - E. City Inspection/Certificate of Completion
All construction work within the public rights-of-way shall be subject to inspection by the City Engineer and/or third party inspection. It shall be the responsibility of the Permittee to provide safe access for the inspector to perform the required Inspections. Upon completion and receipt of affirmation on Inspection and successful execution of required tests, the City will issue a Certification of completion. Upon issuance of the Certificate, the warranty period provided in the Ordinance will commence.
 - F. Warranty Inspection:
The City will inspect the work prior to expiration of the warranty period. If deficient work is found, Permittee shall correct work as provided by Ordinance.

END OF CHAPTER

Chapter 5

STREET PAVING DESIGN REQUIREMENTS

STREET PAVING REQUIREMENTS

5.1.0 CHAPTER INCLUDES

Geometric design guidelines for streets, criteria for street paving and standard paving notes for drawings.

5.2.0 REFERENCES

- A. Refer to the list of references in Chapter1, General Requirements.
- B. Texas Engineering Practices Act & Board Rules and Practices Procedure, latest revision.
- C. AASHTO – American Association of State Highway and Transportation Officials.
- D. ASTM – American Society for Testing and Materials.

5.3.0 DEFINITIONS

- A. Geotechnical Engineer – An engineer certified by the American Association for Laboratory Accreditation (A2LA)
- B. HMAc – Hot-Mix asphaltic concrete
- C. Curb –and–Gutter Sections – Full width concrete pavement with doweled on 6-inch curbs or monolithic curb-and-gutter sections for asphaltic concrete pavement. Curb-and-gutter sections require inlets and underground storm sewers.
- D. Roadside Ditch Sections – Ditch sections adjacent to either full width reinforced concrete pavement or asphaltic concrete pavement. Roadside ditch sections do not required underground storm sewers; however, the ditch sections must be designed to accommodate storm run-off.

5.4.0 DESIGN REQUIRMENTS

The following design requirements are applicable to pavements within City street rights-of-way:

- A. Width Requirements for Roadways: Geometric Design Guidelines for Subdivision Streets included with this Chapter for the Divided Roadway Cross Sections – Urban and Undivided Roadway Cross Sections – Urban.
- B. Minimum Thickness and Reinforcement Requirements for Concrete Pavement: The following requirements are the minimum allowable. Pavement thickness and reinforcement shall be designed by a Professional Engineer based on a current soils analysis, roadway use, traffic loadings, and life span of proposed pavement.
 - 1. For local Type A Streets with pavement widths less than or equal to 30 feet face-to-face (F/F) of curb:
 - a. Minimum concrete slab thickness shall be 6 inches (6") with $f_c' = 3000$ psi and reinforcement with $f_y = 60,000$ psi. Refer to Standard Details for reinforcement drawings. Place expansion joints at the end of each curb return and at a maximum spacing of 80 feet.
 - b. Minimum stabilized subgrade thickness shall be six inches (6").
 - 2. For Minor and Major Arterial Streets:
 - a. Minimum concrete slab thickness hall be eight inches (8") with $f_c' = 3000$ psi and reinforcement with $f_y = 60,000$ psi. Refer to Standard Details for reinforcement drawings. Place expansion joints at the end of each curb return and at a maximum spacing of 80 feet.
 - b. Minimum stabilized subgrade thickness shall be six inches (6").
 - 3. For streets other than described in paragraphs 5.4.B.1 and 5.4B.2 (i.e, streets greater than 30 feet F/F of curb and not major thoroughfares):
 - a. Minimum concrete slab thickness shall be seven inches (7") with $f_c' = 3000$ psi and reinforcement with $f_y = 60,000$ psi. Refer to Standard Details for reinforcement drawings. Place expansion joints at the end of each curb return and at a maximum spacing of 80 feet.
 - b. Minimum stabilized subgrade thickness shall be six inches (6").

- C. Minimum Thickness of Asphaltic Concrete Pavement: Minimum thickness of HMAC surfacing and asphalt treated base shall be as shown on Standard Details.
- D. Subgrade Treatment: Treatment of subgrade shall be determined by a geotechnical engineer. The geotechnical engineer shall base depth of subgrade stabilization on structural number (SN) in conjunction with flexible pavement thickness design.
- E. Requirements for Intersections, Turnouts, and Transitions:
 - 1. At a T-intersection with a street that has not been improved to its ultimate width, concrete pavement shall be stopped either at the right-of-way line or the end of the cur return, whichever would required less concrete removal at a future date.
 - 2. For roadway turnouts placed at an existing cross street intersection, the turnout should be designed to fit the ultimate pavement width of the intersecting cross street and then transitioned to the existing roadway.
 - 3. The usual transition length for meeting a roadside ditch street is 50 feet for street widths less than or equal to 30 feet F/F of curb: 75 feet for 42 feet F/F of curb; and 100 feet for 44 feet F/F of curb.
 - a. Transition sections for streets other than concrete shall consist of asphalt treated base paving. See Standard Specification 205 – Hot Mix Asphaltic Concrete Pavement Details.
 - b. Transitions for concrete streets shall consist of concrete and equal the existing pavement thickness with a minimum thickness of six inches (6"). See Standard Specification 209 Concrete Pavement Details.
 - 4. When meeting existing concrete streets at right angles, the existing street should be saw cut in a V-shape extending from the curb returns to a point where the centerline of the proposed pavement intersects the quarter point of the existing concrete street to create a crowned intersection. In the event this construction creates a situation in which traffic on the existing street, at design speed, will bottom out when crossing the proposed street intersection, a special design will be allowed to eliminate this potentially dangerous condition.
- F. Requirements for Roadway Ditches:
 - 1. Ditch capacity shall be designed to handle storm water runoff in accordance with the Unified Development Code of City of San Antonio.
 - 2. Minimum ditch grades and maximum ditch side slopes shall conform to the requirements of the Unified Development Code of City of San Antonio.
 - 3. Culverts shall be designed to accommodate ditch flow and shall be constructed of reinforced concrete. Wall thickness shall be Wall B as given in ASTM C 76.
- G. Requirements for Roadways with Curb and Gutter Section.
 - 1. Minimum grade line shall be 0.30 percent.
 - 2. Minimum grade line shall be one percent for radii of 35 feet or less around intersection turnouts. Grades for larger radii shall be determined on an individual basis.
 - 3. Vertical curves shall be installed when the algebraic difference in grades exceed one percent. Elevations shall be shown at 10-foot intervals through vertical curves. Maintain a minimum of 0.30-foot elevation change at 10-foot intervals by altering calculated elevations.
 - 4. Radii around cul-de-sacs shall be 40 feet for local Type A and 50 feet for all others.
 - 5. When a curb-and-gutter street intersects a drainage ditch, the gutter elevation shall be above the designed water surface elevation of the ditch.
 - 6. Minimum grade line around a cul-d-sac shall be 0.70 percent.
 - 7. Major thoroughfares shall be super elevated in accordance with recommendation o f AASHTO.
 - 8. Cross slopes for pavement shall be as shown on Standard Details. The minimum cross slope for left-turn lanes and esplanade openings shall be 1/8

inch per foot.

9. Minimum grade line around the longest radius on a local Type A street shall be 0.40 percent.
10. When meeting an existing curb-and-gutter street, top-of-curb elevations shall be designed to meet an elevation six inches (6") above the existing gutter. At existing inlets, top-of-curb elevations shall be designed to match existing top-of-curb elevations.
11. When the curb grades are not established below the natural ground, fill lines shall be shown on the drawings and shall be of sufficient height to ensure a minimum of 3/8 inch per foot transverse slope toward the curb from the property line between a point 2 feet outside the right-of-way line and the top of curb. If this type fill is required and the pavement is adjacent to a nonparticipating property owner, fill easements shall be obtained, filed and a copy of the easements shall accompany the final drawings. Construction of this nature will require back-slope drainage design to prevent trapping storm runoff.
12. The maximum desirable tangent grade to vertical curves at railroad crossings is 8 percent for local streets and 3.5 percent for major thoroughfares.
13. Top-of-curb grades for the outside lanes shall be labeled except at railroad crossings where gutter grades shall be labeled. Centerline grades are acceptable for streets with roadside ditch sections.
14. Roadway grades at railroad crossings shall be zero percent from centerline of the track to 10 feet either side of the track's centerline, and should not cause a drop of more than 6 inches from the top-of-rail elevation at a distance of 30 feet either side of the track's centerline.
15. For concrete roadways, the roadway shall terminate at a railroad header, 6 feet from the centerline of the track and the roadway cross slope shall be zero from the railroad header to 4 feet before the railroad header.

H. Requirements for Curbs, Sidewalks, and Driveways:

1. Standard curb height is 7 inches
2. At railroad track approaches, decrease curbs from 7 inches to zero inches in 2 feet at a distance of 10 feet from the nearest track centerline.
3. Reinforced concrete sidewalks and driveways shall be in accordance with City Standard Details.
4. Reinforced concrete sidewalks is esplanades – Reinforced concrete sidewalks, 6 inches thick, shall be constructed in esplanades when curbs are 10 feet F/F of curb and less in width with a minimum length of 6 feet measured from the face of curb of the esplanade nose. Reinforced concrete sidewalks in esplanades shall be colored black for concrete roadways and uncolored for asphaltic concrete roadways.

I. Requirements for Thoroughfares:

1. When the full section of a thoroughfare is located within the city limits and is dedicated on a final plat, the esplanade and all lanes of the thoroughfare shall be constructed at the time of initial construction of the roadway.
2. If approved by the City Engineer, lanes contained within a plat, left-run lanes and the esplanade to the center line of the right-of-way shall be constructed at the time of initial construction of the roadway when only one side of a thoroughfare is located on a final plat. The remaining lanes, left-turn lanes and esplanade shall be constructed at the time the final plat containing the opposite side of a half constructed thoroughfare is approved.
3. Permanent barricades, conforming to the requirements of the Texas Manual of Uniform Traffic Control Devices, shall be constructed at the termination of lanes on partially constructed thoroughfares. The barricades shall contain a sign reading FUTURE ROADWAY EXTENSION.

J. Requirements for Miscellaneous Items:

1. The type and depth of subgrade treatment shall be as determined by the geotechnical engineer.
2. For proposed driveways, call out centerline stations, widths, and radii.
3. 3. Paving headers shall be placed at the end of concrete pavements.
4. Concrete to be removed shall be removed either to an existing joint or a sawed joint. The groove of the sawed joint shall be cut to a minimum depth of 2 inches along the line designated by the Professional Engineer.
5. Determine minimum vertical curve lengths based on AASHTO design criteria (minimum 3 times design speed) using a minimum design speed of 45 miles per hour for thoroughfares and collector streets and 30 mph for residential streets.
6. Standard City barricades shall be placed at the end of dead-end streets not terminating in a cul-de-sac.
7. A letter of agreement between the City and pipeline company approving the construction plan crossing is required when paving a placed over a transmission pipeline.
8. When meeting existing concrete pavement, horizontal dowels shall be used if no exposed reinforcing steel exists. Horizontal dowels shall be Grade 50 bars, 24 inches long, drilled and embedded 12 inches into the center of the existing slab with PO ROC or approved equal. Dowels shall be 12 inches center-to-center, unless otherwise specified.
9. When concrete is removed for connection with proposed concrete pavement, the pavement shall be saw cut and existing concrete removed to expose a minimum of 15 inches of reinforcing steel. If no reinforcing steel exists, use horizontal dowels.
10. Adjust existing manhole frames and covers within the limits of the proposed pavement to meet the proposed top-of-slab or street elevation.
11. Adjust existing manhole frames and covers outside the limits of the pavement to conform to the final grading plan.

5.5.0 QUALITY ASSURANCE

- A. Final design drawings and specifications shall be prepared by or under the supervision of a Professional Engineer, and all documents shall be sealed, dated and signed by the responsible Professional Engineer, based on the Texas Engineering Practices Act & Board Rules and Practices Procedure, latest revision, and all other State and Federal Laws.
- B. Geotechnical work shall be performed by or under the supervision of a Professional Engineer. All reports and documents shall be sealed, dated and signed by the responsible Professional Engineer, based on the Texas Engineering Practices Act & Board Rules and Practices Procedure, latest revision, and all other State and Federal Laws.

5.6.0 DESIGN ANALYSIS

- A. Pavement thickness and reinforcement shall be designed by a Professional Engineer based on a current soils analysis, roadway use, traffic loadings, and the life span of proposed pavement.
- B. The number and location of storm sewer inlets shall be designed to accommodate storm water runoff. A graphical plot and calculations of the hydraulic gradient shall be furnished by the design engineer. The hydraulic gradient shall be in accordance with the Unified Development Code of the City of San Antonio.
- C. Roadside ditch drainage and culverts shall be designed in accordance with the Unified Development Code of the City of San Antonio.

5.7.0 DRAWINGS

- A. Construction drawings shall be prepared in compliance with Chapter 8 Graphic

Requirements.

5.8.0 GEOMETRIC DESIGN GUIDELINES

- A. Refer to Geometric Design Guidelines for Streets, City of San Antonio provided at the end of this chapter.

5.9.0 STANDARD PAVING NOTES FOR DRAWING CALL OUTS

- A. The following notes or phrase are specific to paving improvements and should be included in final design drawings containing paving improvements. The plan-and-profile sheets should reference the notes or phrase in the plan view by note number as listed below.

Paving Notes:

1. Proposed asphalt treated base as shown on Standard Specification 206 – Hot Mix Asphaltic Concrete Pavement Details.
2. Proposed sawed joint and expose 15-inches of reinforcing steel. If no reinforcing steel exists, use horizontal dowels. See Note 10.
3. Proposed esplanade curb.
4. Proposed standard monolithic curb and gutter as shown on Standard Specification 500 Curb, Curb and Gutter and Header Curb.
5. Dowel on 6-inch curb after asphaltic surfacing is in place, or into existing concrete pavement, as applicable.
6. Rack over existing manhole to miss proposed curb, if conflict exists. Maximum rack of one-inch per course of brick.
7. Remove and replace sidewalk as directed by the Engineer.
8. Proposed $\frac{3}{4}$ inch board expansion or pre-molded non-extruding joint between walk and curb.
9. Remove a sufficient length of concrete pipe, as determined by the Engineer, and connect to proposed inlet with reinforced concrete pipe of like diameter.
10. Horizontal dowels shall be No. 6 bars, 24 inches long, drilled and embedded 12 inches into the center of the existing slab with PO ROC or equal. Dowels shall be 12 inches, center to center, unless otherwise specified.
11. The contractor shall notify the City Traffic Signal Division, 10 working days in advance for relocation of existing traffic signal poles.
12. Adjust existing inlet to fit new grade and alignment.
13. Decrease curb exposure from 7 inches to 2 inches in 1 foot.
14. Decrease curb exposure from 7 inches to 2 inches in 4 feet.
15. Decrease curb exposure from 7 inches to 0 inches in 2 feet.
16. Proposed reinforced concrete sidewalks shall be colored black for concrete roadways and uncolored for asphaltic concrete roadways.
17. Rip-Rap shall be placed on slopes and ditches as directed by the Engineer.
18. Covert existing inlet or manhole with inlet top to manhole.
19. Remove existing culvert
20. Remove and replace pipe culvert as directed by the Engineer.
21. Existing structure to be removed.
22. Break into barrel of monolithic reinforced concrete storm sewer. Cost to be included in the unit price bid for storm sewer or lead, as applicable.
23. Proposed doweled-on, 12-inch-wide mountable curb.
24. Shaded area denotes approximate limits of proposed asphalt overlay.
25. Remove existing inlet. Plug and abandon lead.
26. Remove existing concrete pavement, concrete base, and cement stabilized shell base course with or without asphalt surfacing.
27. Proposed asphalt overlay.
28. Remove inlet and extend lead.
29. Meet existing curb or curb and gutter for grade and alignment.

30. Proposed wheelchair ramp, as shown on Standard Specification-Wheelchair Ramp Details.
 31. Adjust existing manhole frame and cover to fit new grade.
 32. Remove curb or curb and gutter, as applicable.
 33. Adjust existing water valve boxes to new paving grade. Replace missing or damaged valve boxes and covers.
 34. Replace Type B inlet with Type BB inlet or Type C-1 inlet.
 35. Remove mountable curb.
 36. Proposed pavement markings as shown on Standard Specifications-01-Pavement Marking Details.
 37. Proposed white plastic marker as shown on Traffic and Transportation Drawing, Standard Elongated Word and Arrow Symbol Design Details for Pavement Markings.
 38. Proposed plastic marker, as shown on Traffic and Transportation Drawing, Standard for Left Turn Channelization.
 39. Proposed standard concrete paving header as shown on Standard Specifications-Curb, Curb and Gutter and Header Details.
- B. The following notes or phases are specific to Asphalt Overlay Improvements and should be included in final design drawings containing Asphalt Overlay Provisions:
1. The Contractor shall be responsible for determining the existence, depth, and location of all utilities. The Contractor shall also be responsible for any damage to and for the maintenance and protection of the existing utilities even though they may not be shown on the plans. Any damage that might occur shall be repaired at the Contractor's expense.
 2. Due to Federal Regulations Title 49, Part 192.181, C.P.S. must maintain access to gas valves at all times. The Contractor must protect and work around all gas valves that are in the project area.
 3. Contractor to protect and support telephone company plant during construction.
 4. The following is a list of the telephone numbers of the utility locators for the various utilities that may be encountered :

City Public Service	1-800-545-6005
City Traffic Signals Operations	207-7765
S.W. Bell Telephone	1-800-545-6005
San Antonio Water System	704-7107 or 704-7107
	Emergency 227-6143
Time-Warner Cable	1-800-545-6005
 5. Concerning utility adjustments which are to be performed by others, minimum of 10 days notice shall be given by the Contractor to the concerned utilities prior to seal coating so that the necessary adjustments can be made.
 6. Contractor to contact City Traffic Signal Operations Superintendent at 207-7765 48 hours prior to any milling.
 7. All existing raised pavement markings shall be removed by the Contractor daily as the work progresses and as approved by the Engineer. This work will not be paid for separately but shall be considered subsidiary to the various bid items. Materials removed shall become the property of the Contractor.
 8. All waste materials shall become the property of the Contractor and it shall be his sole responsibility to dispose of these materials off the limits of the right-of-way and on private property where the Contractor has the consent of the owners. No waste material shall be placed in designated F.E.M.A. flood plains or in low areas that will block or alter the flow of existing natural drainage.
 9. The Contractor shall be responsible for restoring to its original or better condition any damages done to existing fences, buildings, driveways,

- sidewalks, curbs or other structures.
10. Actual "Base and Pavement Replacement", "H.M.A.C.P., Type D, (Level-Up)", and temporary paint traffic markings quantities may be varied by the Engineer.
 11. Payment for all Level-Up courses shall be made under Item No. 205G. Placement of Level-Up asphaltic materials shall be performed by a motor grader. Allowable Level-Up materials shall be Hot Mix/Hot Laid Asphaltic Pavement Type "G" as specified in Item 205. The locations and depths of Level-Up shall be as directed by the Engineer.
 12. Building paper shall be placed over all manholes, valve boxes, grates, etc., so as to protect the surfaces from asphaltic materials and shall otherwise remain visible and accessible throughout the duration of the project. Asphaltic materials shall not be placed, lapped, or splashed onto adjacent structures.
 13. All asphalt cuttings and aggregate materials shall be confined to the street surface where they shall be swept up and removed by the end of each workday.
 14. All materials, such as asphalt cuttings and Seal Coat aggregate, not used by the end of each work day must be stored at locations other than the street surface.
 15. Repaired Base Failures shall cure-out for a minimum of fifteen (15) days prior to it being Seal Coated.
 16. Base and pavement failures located between existing railroad tracks shall be carefully removed up to the top of the railroad ties and replaced with new materials as per detail. Any damage to Railroad system due to work performed by the Contractor shall be repaired by the Contractor at his own expense. (Pay Item No. 257)
 17. Pavement cuts shall be as performed by approved equipment and shall not remain in such a state whereby the cut presents a hazard to traffic.
 18. All daily base and pavement failure replacements shall be properly excavated, barricaded, and open to traffic the same day.
 19. Asphalt Treated Base and pavement mixtures shall be at a temperature between 225°F and 350°F when placed in excavated cuts. When the asphalt temperatures fall below 225°F, the asphalt must be discarded and payment will not be made for the discarded material.
 20. Street surfaces adjacent to manholes, water valves, drain grates, bridge joints, curbs, etc., shall be completely milled to the depth as specified for the street unless otherwise directed.
 21. Typically, milling of asphaltic pavement shall be performed within turnouts which are adjacent to streets which have been identified in the plans to be milled.
 22. Should existing base materials become exposed due to milling, the Contractor shall protect and maintain the existing compacted base until which time it can be overlaid. Exposed flexible bases shall be rolled and primed coated as directed by the Engineer.
 23. Actual depths of milling along curb lines and on bridge decks shall be as directed. Concrete bridge decks shall not be milled.
 24. Prior to the application of Seal Coat, all manholes shall be adjusted so that the ring and cover are flush with the finished grade of the new pavement. A single payment at the Contractor's unit bid price shall be made for each manhole adjusted to the finished grade of new pavement. Due to occasional varying depths of new pavement placement, repeated adjustments may become necessary to match the new finished grade.
 25. Each street shall be Seal Coated in its entirety, including adjacent turnouts, prior to sealing other streets within the project unless directed otherwise,
 26. All aggregate for Seal Coat shall be delivered to the job site at atmospheric

temperature. Aggregate shall be adequately dried to the satisfaction of the Engineer prior to its usage in the Seal Coat.

Seal Coat material data :

Asphalt - Type / Grade

Binder Oil : CRS - 2P

Precoat Oil: MS-1 or CSS-1

Asphalt – Rate

0.28 - 0.32 gal./SY

Aggregate - Type / Grade

Precoated crushed limestone, grade 4

Aggregate - Rate

18 - 20 lbs./SY

27. It is the intent that an asphalt cement binder oil be used for all Seal Coating, however if weather conditions are not conducive for its application, then an emulsion may be used at no extra pay.
28. Within a given day, the Contractor shall not plane mill or overlay a street beyond the longitudinal limits of which he cannot mill or overlay for its full width unless directed otherwise by the Engineer.
29. The percent wear of the Seal Coat aggregate material, as determined by Test Method Tex-410-A, shall not exceed 25%.
30. Contractor shall maintain Seal Coat.
31. Overlaying of street surfaces may commence the following day after which an acceptable application of seal coat has been applied as determined by the Engineer.
32. It is the intent that Hot Mix Asphaltic Pavement, Type "C" shall be applied at a rate of 165 lbs./SY for overlaying purposes; however, the actual application rate may be greater where directed by the Engineer.
33. Coarse aggregate material used for "H.M.A.P., (friction surface)" shall be composed of 30% by weight of crushed Trap Rock or crushed gravel. The percent wear of such material, as determined by Test Method Tex-410-A, shall not exceed 25 %.
34. All concrete surfaces and construction joints, which will contact the proposed the "H.M.A.C.P." overlayment shall be painted with a thin uniform coat of RC-250, used for tack coat. Tack coat shall meet the requirements of Item 203 and shall be at no direct pay.

C. TRAFFIC NOTES AND SPECIAL CONDITIONS

The following notes or phrases are specific to all work effecting the motoring public.

1. It is the Contractor's sole responsibility to see that all traffic control devices are properly installed and maintained at the job site in accordance with the plans, specifications and related industry standards and regulations. The Contractor shall submit for review a sign and barricade plan conforming to the requirements of the Texas Manual on Uniform Traffic Control Devices. The City's construction observer/ inspector (COI) and the traffic engineering representative will only be responsible to inspect the traffic control devices being deployed. If in the opinion of the traffic engineering representative and the COI, the traffic control devices do not conform to established standards or are incorrectly placed or are insufficient in quantity to protect the general public, the COI shall have the option to stop construction operations at no expense to the City until such time as the conditions are corrected by the Contractor.
2. Prior to removing any traffic signs or traffic signals, the Contractor shall contact the City of San Antonio Traffic Operations section at 207-7765. Prior to completion of the contract and removal of the barricades, the Contractor shall again contact the Traffic Operations section. The barricades shall not be removed until all applicable permanent traffic signs and signals are in place.
3. It is the Contractor's responsibility to obtain and maintain temporary stop

signs and all other traffic control devices required to protect the general public. If the City of San Antonio has removed permanent stop signs, the Contractor shall request that the signs be returned to the construction site to be reinstalled by the Contractor. All Permanent signs or traffic control devices missing or damaged upon completion of construction shall be replaced at the contractor's expense.

4. The Contractor must contact the City's COI forty-eight (48) hours in advance (not including weekends) of any minor street closure. It will be the Contractor's responsibility to advise the COI ten (10) days in advance of an arterial total street closure. This much time is necessary to install advisory signs and give the motorists a minimum of seven (7) days notice of the street closure. The COI after being notified will contact the traffic engineering office to make the necessary arrangements.
5. As work progresses, location of temporary traffic control devices will be adjusted and modified, as necessary the Contractor at the Contractor's expense.
6. If the need arises, additional temporary traffic control devices, special directional devices, and/or business name signs may be ordered by the traffic engineering representative at the Contractor's expense.
7. Temporary traffic control devices shall conform to the City's "Typical Sign and Barricade Standards" sheets and to the Texas Manual on Uniform Traffic Control Devices.
8. The Contractor is responsible for repairing all streets outside of the project limits which were damaged by construction activities. The replacing section must be approved by the City's Street Engineer. There will be no direct payment for this work.
9. The Contractor shall be responsible for providing suitable access accommodations for school children and pedestrians.
10. The Contractor shall provide access for delivery of mail by the U.S. Postal Service.
11. The Contractor shall provide for access to residences and all businesses at all times within all the phases of the work.
12. When construction work necessitates the utilization of vehicle paths other than the lanes normally used, traffic control markings no longer applicable shall be removed and approved temporary pavement markings and signs installed in accordance with Part VI-D of the Texas Manual on Uniform Traffic Control Devices. After construction is completed and traffic is rerouted back to the original lanes, the traffic control markings and/or raised buttons that were originally removed from the existing pavement must be replaced. In addition, temporary markings must be removed.
13. All temporary traffic control devices, etc. shall be provided by the Contractor without direct cost to the City of San Antonio, unless otherwise noted or stated.
14. Any damage to permanent traffic signals, the controller box, loops or conduits during or upon completion of the project shall be repaired or replaced at the Contractor's expense. The decision to repair, as opposed to replace, the damaged equipment shall be made by the City's Traffic Engineer. The Contractor is responsible for repairing all streets outside of the project limits which were damaged by construction activities. The replacing section must be approved by the City's Street Engineer. There will be no direct payment for this work. The cost is to be included in other items. Off-duty police officers will be required as directed by the Traffic Engineer at no direct payment, cost to be included in other Bid Items. This will be a requirement when working in or adjacent to a signalized intersection and where two-way traffic is to be maintained.

15. The Contractor shall provide the City and emergency telephone number for evenings, weekends, and holidays by the first working day of the project. This telephone number must be a commercial answering service. The answering service must be able to contact the Contractor and the Contractor respond back to the City staff within two hours of the initial contact.
16. Locations and layout of Detector Loop Replacements shall be verified by the City Traffic Engineer prior to their removal and installation.
17. It shall be the Contractor's responsibility to notify all residents and businesses adjacent to the project of construction operations and schedules. The City shall provide all printed notification material to the Contractor for his distribution to the affected citizens and businesses.
18. The Contractor has the responsibility for posting and removing all temporary "no parking signs", which are to be provided by the City, at all work sites as directed.
19. After utilities have made their required manhole and valve adjustments, it shall be the Contractor's responsibility to properly barricade and maintain the barricades to ensure that the public is safeguarded while traveling within the construction area. The Contractor shall contact the Traffic Engineer for a review of the adequacy of the barricades. There shall be no separate payment for this item.
20. The barricade company shall supply the Contractor with a sufficient number of quality standard barricades and other traffic control devices by M.U.T.C.D. standards as needed. The barricade company shall also supply the Contractor with two (2) full-time qualified personnel whose sole responsibilities pertaining to this project are to establish and maintain proper construction work zone traffic control and related devices. These persons shall provide documented evidence that they have received specialized training in construction work zone traffic control within two years on the contract date. Any and all traffic control devices needed and necessary personnel will be at the Contractor's expense.
21. For streets which accommodate four (4) or more traffic lanes, the following restrictions will apply:
 - a. Two-way traffic shall be maintained.
 - b. A minimum of two lanes shall remain open for traffic.
 - c. No more than 1,000 linear feet of a roadway lane may be closed during construction operations.
 - d. A minimum of one (1) off-duty Police Officer shall be required on site during base failure repair, seal coating, milling, and H.M.A.C.P. overlay operations.
 - e. Work may be performed on Weekends with prior approval from the Engineer.
 - f. When performing work operations at night, the contractor shall provide adequate lighting to perform the necessary operations. In addition, all vehicles must be equipped with one or more high intensity yellow flashing lights.
 - g. Flashing warning lights and/or flags shall be used to call attention to all advance warning signs.
 - h. Signs which read "FRESH OIL" shall be placed at each end of work areas and at all turnouts adjacent to work areas where Seal Coating is being performed until such time that the Engineer gives permission for their removal.
 - i. Signs which read "CONSTRUCTION AHEAD. TRAFFIC DELAYS TO BE EXPECTED" shall be placed at each end of work areas. Said signs shall be 60" x 30" and shall be orange with black lettering.
22. All traffic markings shall be placed in accordance with the City's Traffic

Engineer. He shall be given a minimum of forty-eight (48) hours notice prior to the application of any markings.

23. All streets, for their full width, shall be open to traffic at the end of each work period.
24. Approved temporary short-term expendable pavement markings shall be provided to delineate lane continuity prior to the application of standard markings by the use of flexible-reflective road marker tabs. Once the existing standard pavement markings have been obliterated, such tabs shall remain in place for a maximum of fourteen (14) days after which time standard thermoplastic pavement markings must be applied. At the Contractor's option, the Contractor may apply standard painted markings prior to the application of the thermoplastic markings for an interim period of time.
25. Subsequent to an initial application of standard painted markings, repeated applications of such may become necessary until standard thermoplastic traffic markings are in place. As a function of the marking's effective visibility, the Engineer will determine when re-application of the painted markings are necessary. Painted markings shall be applied to delineate full centerlines and lane lines and will require glass beads.
26. Standard thermoplastic traffic markings are to be placed in no less than 2 days from a successfully completed H.M.A.C.P. application.
27. Contractor to contact the City's Traffic Engineering office at 207-7758 48 hours prior to sidewalk and curb construction where City owned traffic facilities exist. Contractor shall secure approval from Engineer prior to such construction. No wire splices shall be made outside the pull box. If wires should be cut outside the pull box by the Contractor, said Contractor shall then replace the entire wire.

END OF CHAPTER

Chapter 6

SURVEY REQUIREMENTS

SURVEY REQUIREMENTS

6.1.0 CHAPTER INCLUDES

Suggested guidelines for use by engineers in development of construction drawings and right-of-way maps inside the San Antonio City limits. These guidelines are required for City of San Antonio Capital Improvement Projects and Utility Capital Improvement Projects.

6.2.0 REFERENCES

- A. Professional Land Surveying Practices Act, latest revision.

6.3.0 DEFINITIONS

- A. Survey Field Books-Bound standard engineer's field books for transit and level, 7-1/4 inch by 4-3/4 inch.
- B. Data Collection Base – A database printout file reflecting station occupied, back sight, point number, angle, distance, elevations, and identification code; or station and offset left and right from a centerline or control line (transit, baseline, traverse, survey, etc.).
- C. City Surveyor – An authorized representative of the City having approval authority for privately-funded projects or having authority for administration of contracts for the City.

6.4.0 DESIGN REQUIREMENTS

- A. Adhere to these guidelines for any City of San Antonio design project and utility Capital Improvement Projects.

6.5.0 SUBMITTALS

- A. For work performed through an engineering service contract with the City, deliver field books and an electronic file in standard ASCII format (Point Number, Northing, Easting, Elevation, Description). Photocopies or carbon copies of field books are not acceptable. Field books and electronic files will be retained in the City's permanent files.
- B. For right-of-way drawings identifying or describing acquisition of new or additional rights-of-way, deliver field books and database printout files to the City Surveyor or a designee of the City Surveyor. Additional documents to be submitted are:
 - 1. Overall map of rights-of-way with individual drawings of parcels identified on overall maps. Map or drawing media shall be mylar.
 - 2. Computer printouts of coordinate computations.
 - 3. Abstract information and copies of instruments used (i.e., deed) in preparation of the right-of-way.

6.6.0 QUALITY ASSURANCE

- A. Field surveying used in the development of construction drawings, calculations and preparation of right-of-way maps, and field note descriptions shall be performed by or under the direct supervision of a Professional Surveyor.
- B. Surveys shall comply with the latest revision of the Professional Land Surveying Practice Act of the State of Texas
- C. Field notes, descriptions and right-of-way maps shall have the imprinted or embossed seal of the responsible Professional Surveyor and shall be dated and signed by the Professional Surveyor.
- D. All Surveyors, when establishing horizontal control, shall transcribe onto the pages of a standard Survey Field Book, as described in paragraph 6.3, all angles and distances, at the time of measurement, with an accompanying sketch. When establishing vertical control, the surveyor shall use differential leveling methods, and transcribe the vertical data onto the pages of said standard Survey Field Book, with

an accompanying sketch.

6.7.0 FIELD WORK

- A. For engineering contracts with the City, field work shall be recorded in field books or on total station database printouts. Obtain a field book number from the Survey Section or City Engineer and record this identification in the title block on drawing sheets.
- B. The control line must be monumented at its beginning, end, and at angle points with markers of a permanent nature, such as iron rods, spikes or other lasting identification. Make reference drawings for each control monument showing ties to planimetric features to allow easy recovery. Set markers at a maximum of 1000 feet on long lines.
- C. Make ties of the found right-of-way monuments and property corners to the control line.
- D. Use City datum for elevations when available. Set temporary bench marks (TBM) within 200 feet of the beginning and end of the project and at intervals not to exceed 1000 feet throughout the project.
- E. Show centerlines and angles of intersections of side streets with the main roadway centerline station.
- F. Record topographic features within the public right-of-way, proposed right-of-way, any contiguous easements to the right-of-way, and any construction right-of-way of the project and on intersecting streets for a distance of 20 feet beyond the intersection of the right-of-way lines. Identify all visible underground structures, such as inlets, manholes and junction boxes, with size, depth and type.
- G. Cross sections shall be taken at intervals of 100 feet. For levels recorded in field books, record rod reading or elevations as numerator and distance right or left on the base or centerline as the denominator. Data collector of a total station can be used to acquire necessary elevations at required intervals. Record elevation of driveways at intersection of driveway centerline with existing or proposed right-of-way line.
- H. For acquisition of new or additional rights-of-way:
 - 1. Tie points of commencing (POCs) or points of beginning (POBs) for each parcel to the City survey monuments, if within 2000 feet of the parcel. In the event any on parcel in the right-of-way is within 2000 feet of a City monument, tie all parcels to the monument.
 - 2. For projects more than 2000 feet from a City survey monument, job coordinates will be permitted with the origin of coordinates shown and monumented on the map. The assumed coordinate system must leave no question as having any relationship to true "x", "y" using the Texas State Plane Coordinate System.
 - 3. Set ½ inch x 18 inch iron rods or permanent markers at the intersections of the proposed right-of-way and property lines of parcels to be acquired.
 - 4. Identify monuments, corners, angle points, points of curve (PCs), point of intersection (PIs), points of tangency (PTs), and other points as either "found" or "set". Describe each point such as ½ inch iron rod, ¾ inch iron pipe, axle, concrete marker, disk, or other item.
 - 5. Locate improvements, buildings, fences, permanent signs, and other structures within the parcel or within 10 feet of the proposed right-of-way that will influence the value of the parcel to be acquired.

6.8.0 CALCULATIONS

- A. Calculate coordinates of proposed right-of-way parcels, control points, found or set monuments, curve data, lengths, stations and offsets to monuments, and proposed improvement features. Calculate areas, cross sections and volumes associated with construction drawings.
- B. Computer printouts of the coordinate calculations should be submitted to the City

with field books and database printout files.

6.9.0 CONSTRUCTION DRAWINGS

- A. Found existing right-of-way monuments or property corners must be plainly shown on the drawings and located by station and distance, right or left from the control line, or construction centerline. Monuments used to establish the control line must be identified as Control Points, and their relationship to the construction centerline and to the proposed or existing right-of-way lines must be shown. If the project is dimensioned from a control line, such as construction or design baseline, which is different than the control line referenced in paragraph 6.7.0, it must be established and monumented in accordance with the requirements of paragraph 6.7.0. Coordinates for transverse control points and all points of cure, points of tangency and point of intersection along the design baseline shall be shown.
- B. Show location and identification of existing City survey monuments, right-of-way monuments, and found property corners by station and distance, right or left of control line or centerline. Show swing ties set for control or centerline control.
- C. Show and identify location of the City datum monuments and temporary bench marks used for elevation control with year of the City datum on each sheet of the drawings. List the TBM located closest to that particular sheet in a station/offset, description and elevation format.
- D. Show centerline angles of intersection of side streets with main roadway centerline. Where bearings are used, identify source of bearings and show bearings on both control line and project centerline when they are not the same line.
- E. Identify locations of manholes, angle points, ends, etc. for proposed wastewater, storm sewers, water lines and pavement features such as radius returns and centerlines of boulevard openings. Show relationship of proposed improvements to the right-of-way.
- F. For bridges, overpasses and underpasses, show top of pavement elevations at gutter line and centerline for the following locations:
 1. Construction joints
 2. Armor or expansion joints
 3. Intervals between bents that correspond to the increments used for dead load deflection calculations.
- G. For bridges and grade separations, drawings must incorporate layout sheets which identify proposed centerline and curve information plus:
 1. Surface coordinates for control points so that an inverse between coordinates reflects a surface distance. Identify origin of coordinate system used.
 2. Show coordinates of centerline or control line at PIs.
 3. Show coordinates of curb lines at their intersection with the centerline of bents and abutments for irregular structures.

6.10.0 RIGHTS-OF-WAY

- A. Show true "x," "y" values (i.e., grid) on monuments based on the City survey control and the scale factor used to determine the "x," "y" values. Distances shown shall be surface distances and plainly marked as such. Show ties to the POC or POB of each right-of-way parcel from the City survey monuments using the Texas Plain Coordinate System bearings and surface distances.
- B. Surveyors may use assumed coordinates on any project that is located more than 2000 feet from any existing City of San Antonio monument. Show location of monuments used as origin of job coordinates. The assumed coordinate values must leave no question as to their relationship with true "x," "y" using the Texas State Plain Coordinate System.
- C. Distances on proposed right-of-way lines shall be continuous from beginning to end of the job. Show either straight line or arc distance across intersecting streets.
- D. Where a parcel is taken from a larger tract, show dimensions, distances, and area of

- the remainder of the tract based on recorded information.
- E. Identify the evidence used to decide the final placement or establishment of the proposed right-of-way line, such as angle points, or corner monuments, as either "set" or "found." The description of each point used shall be shown on the drawing as identified in the field survey.
 - F. Coordinate values of "x," "y" shall be shown for PCs, PTs, and PIs of curves on the proposed right-of-way lines. Curve data must include the following: delta, radius, arc length, chord length, and chord bearing.
 - G. Coordinate values of "x," "y" must be given on the POB of at least one tract in each block. Where the proposed right-of-way is to be acquired from a large tract of land, coordinate values should be given for the POB of field note description of the large tract.
 - H. Other information to be shown on right-of-way maps:
 - 1. Improvements such buildings, fences, permanent signs, and other structures located on the property or within 10 feet outside the right-of-way line that will influence the value of the parcel to be acquired.
 - 2. Abstract information used in preparation of the right-of-way map.
 - 3. Field book numbers obtained from the City Surveyor.
 - 4. Real estate numbers obtained from the City Surveyor, Right-of-Way Manager, or Real Estate Division.

6.11.0 DOCUMENTS

- A. Where new construction will damage, destroy, or alter existing survey markers, include in specifications a requirement for installation of survey marker boxes by construction contractor at a unit price per box. The City Surveyor will determine the number and location of boxes to be furnished and installed by the contractor.
- B. Maps and metes and bounds field notes shall have the Professional Surveyor's seal imprinted or embossed on them and shall have the Professional Surveyor's signature and date affixed to the instrument.

END OF CHAPTER

CHAPTER 7

GEOTECHNICAL REQUIREMENTS

GEOTECHNICAL REQUIREMENTS

7.1.0 INTRODUCTION

This chapter includes minimum geotechnical investigation requirements for design of utilities with a trench depth of five feet (5.0') or more; utility facility greater than twenty inches (20") in diameter and all Street or Alley Paving Projects. Utilities include water lines, wastewater systems, and storm water drainage conduits and open channels. Streets include design of street pavements. This chapter is not intended to address tunnel projects.

7.2.0 REFERENCES

- A. AASHTO – American Association of State Highway and Transportation Officials.
- B. AREA – American Railroad Engineering Association.
- C. ASTM – American Society for Testing and Materials.
- D. OSHA – Occupational Safety and Health Administration.
- E. TxDOT – Texas Department of Transportation, Foundation Exploration and Design Manual.
- F. TNRCC – Texas Natural Resource Conservation Commission.

7.3.0 INVESTIGATION REQUIREMENTS

- A. A geotechnical investigation is required prior to design under the conditions listed below. Data from earlier project design activities can be incorporated if sufficient and reliable for the current project. A geotechnical investigation by borings is required for design of:
 - 1. Underground utilities using open cut methods.
 - 2. Underground utilities to be augured beneath existing streets, pipelines, or other obstructions or structures.
 - 3. Street paving.
 - 4. Construction which could affect the integrity of adjacent structures, with the exception of utilities at a depth less than 5 feet, interconnections such as service connections, and meter vault installations.
- B. Install piezometer(s) in a water-bearing layer.
 - 1. Read water levels 24-hours after initial installation and at 30 days just prior to removal and grouting.
 - 2. Space piezometers no greater than 2500 feet apart.
- C. The minimum geotechnical recommendations shall consist of the following:
 - 1. Open-cut Trenches: Bedding, backfill, excavation wall and bottom stability, thrust restraint, ground water control requirements at boring locations, dewatering method, and flexible pipe design parameters.
 - 2. Auger Installation: Soil design parameters, ground stability, auger pit excavation stability, dewatering recommendation.
 - 3. Appurtenance: Bearing capacity, lateral earth pressures, excavation stability, dewatering.
 - 4. Open Channel: Slope angle or slope ratio, setback distance, and erosion protection.
- D. All projects requiring a geotechnical investigation shall have a reconnaissance fault study to determine the potential for known active faults to impact the project. If the project is part of a larger tract for which a reconnaissance fault study is available, the results of the study on the larger tract will satisfy this requirement.
- E. For privately funded subdivision development in the City or subdivision development in a utility district, when borings have been conducted for a master study of the development and development of an adjacent section has been conducted, subsequent design within sections of the master planned area may not required individual borings or a geotechnical report. The borings and report may not be needed if the project design provides for field verification of encountered condition by direct supervision of a registered geotechnical engineer and provides for response to

unexpected soil conditions encountered during construction and those responses are in accordance with City design standards.

7.4.0 INVESTIGATION OF GRANULAR AND COHESIVE SOILS

- A. A bore-hole sampling and testing procedure shall include obtaining undisturbed Shelby Tube samples in cohesive soils and Standard Penetration Test Split-Barrell samples in granular soils, if not otherwise required (see paragraph 7.5.0). Continuous sampling shall be performed to a minimum depth of 10 feet, and at 5-foot intervals below that depth. Additional samples shall be obtained at strata changes encountered within the standard 5-foot sampling intervals.

7.5.0 INVESTIGATION CRITERIA

- A. Utility Line Projects. The frequency and depth of borings for utility line project shall not be less than described below unless waived by the City Engineer. Bore an additional 5 feet if the last planned sample is in water-bearing sand. Make borings within an offset distance of no more than 20 feet from the centerline alignment of the utility line or at the location of the proposed structure. Soil borings shall be made at a spacing not greater than 500 feet with additional boring at closer spacing to better define areas of inconsistent stratigraphy.
1. Open-cut Construction and Auger Pits:

Table 7.1.1
REQUIREMENTS FOR BORING DEPTHS

TRENCH WIDTH	TRENCH DEPTH	BORING DEPTH
Up to 6 feet	All	Trench Depth + 5 feet
Greater than 6 feet and up to 10 feet	Up to 10 feet	Trench Depth + 5 feet
Greater than 6 feet and up to 10 feet	10 to 15 feet	Trench Depth + 10 feet
Greater than 6 feet and up to 10 feet	Greater than 15 feet	Trench Depth + 1.5 times trench width
Greater than 10 feet	All	Trench Depth + 1.5 times trench width

2. Augured Sections: Make boring depth to line depth plus 5 feet for lines up to 10 feet deep. For lines over 10 feet deep, make boring depth to line depth plus 10 feet.
- B. Water Line Projects
1. The frequency and depth of borings for water line projects shall conform to those listed in paragraph 7.5.0A, Utility Line Projects.
 2. A geotechnical investigation is required for any waterline with nominal bedding depth greater than 5 feet or water line diameter greater than 20 inches.
- C. Wastewater Line Projects
1. The frequency and depth of borings for wastewater line projects shall conform to those listed in paragraph 7.5.0A, Utility Line Projects.
 2. In addition, at least one boring must be made within 20 feet of the proposed center of a lift station. For lift stations 30 feet in diameter or larger, make one boring at the center; add borings around the periphery at maximum 50 feet spacing.
 - a. For City projects, the boring shall extend to:
 - (1) A depth of B below the bottom of the lift station, or

- (2) A depth of 0.75 "D" below the bottom of the lift station, whichever is greater,
Where: "B" is the width or diameter of the lift station, and
"D" is the depth of the lift station or excavation

- b. For projects within the City's extra territorial jurisdiction (ETJ), the boring shall be to a minimum depth of 10 feet below the base of the structure.
3. For City projects, install a piezometer within 20 feet of the center of the lift station. Read the water level again at 30 days after initial installation, then remove the piezometer and grout the hole.
4. Other structures: A boring program shall be established by the owner and structural engineer in consultation with the geotechnical engineer.
- D. Storm Drainage, Box Culverts and Open Channels
 1. The frequency and depth of borings for storm drainage pipes and box culverts shall conform to those listed in paragraph 7.5.0A, Utility Line Projects.
 2. Open Channels
 - a. Soil borings shall be made at a spacing not greater than 500 feet with additional boring at closer spacing to better define areas of inconsistent stratigraphy.
 - b. Channel depth (d) less than or equal to 10 feet, extend boring D feet below the ditch bottom.
 - c. For channel depth greater than 10 feet and less than or equal to 20 feet, extend boring 10 feet below the ditch bottom.
 - d. For channel depth greater than 20 feet establish boring depth to provide sufficient geotechnical information for design.
 3. Soils information for culverts in roadside ditches shall be obtained from soil borings made for the paving design, as described in paragraph 7.5.0E, Street Paving.
- E. Street Paving
 1. Soil borings shall be made at a spacing not greater than 500 feet.
 2. The depth of borings shall be at least 5 feet below the top of the curb for curb-and-gutter sections and 5 feet below the crown of the road for open ditch sections, or 3 feet below ditch invert, whichever is greater.
 3. Rigid Paving
 - a. The minimum geotechnical recommendations shall consist of the following: Pavement thickness, including minimum reinforcing and minimum subgrade treatment, as required in Chapter 10, Street Paving Design Requirements.
 4. Flexible Paving
 - a. Design Structural Number (SN), pavement thickness, subgrade treatment, as required in Chapter 5, Street Paving Design Requirement.
 5. Rehabilitation – rehabilitation recommendations.

7.6.0 LABORATORY TESTING PROGRAM

- A. Laboratory Tests may include but not be limited to the following:
1. ASTM D 4318 - Liquid Limit, Plastic Limits and Plasticity Index of Soils
 2. ASTM D 1140 - Amount of Material in Soils Finer than the No. 200 Sieve.
 3. ASTM D 2216 - Laboratory Determination of Water Content of Soil, Rock and Soil-Aggregate Mixture.
 4. ASTM D 422 - Particle Size Analysis of Soils
 5. ASTM D 2487 - Classification of Soils for Engineering Purposes.
 6. ASTM D 2166 - Unconfined Compressive Strength of Cohesive Soils.
 7. ASTM D 2850 – Unconsolidated-Undrained Compressive Strength of Cohesive Soils in Tri-axial Compression.
 8. ASTM D 2435 – One-Dimensional Consolidation Properties of Soils.

9. ASTM D 698 – Laboratory Compaction Characteristics of Soil Using Standard Effort.
10. ASTM C 1883 – CBR (California Bearing Ratio) of Laboratory-Compacted Soils.

7.7.0 SURVEY REQUIREMENTS

- A. Within the public domain, the locations and elevations of boreholes and piezometers shall be determined by surveying. Elevation and coordinates shall be shown on boring logs. Station and offset shall be shown on boring logs for street projects and utility line work.

7.8.0 SITE RESTORATION

- A. Site Cleanup along developed right-of-way. Clean the boring site by removing cuttings and mud and other debris. Fill ruts or pits in the ground to original conditions and elevation.
- B. Abandonment of Boring and Piezometers.
 1. Piezometer abandon in accordance with TNRCC Rules, Chapter 238- Well Drillers and Water Well Pump Installers.
 2. Borehole: Backfill with cement grout using tremie method. For non-paved areas and depths less than or equal to 10 feet, soil backfill tamped into the borehole is acceptable provided that the conditions and methods are in agreement with TNRCC Rules. Boreholes or peizometers installed in know contaminated areas, or in which contamination otherwise has been detected, shall be abandoned in accordance with the applicable provisions of TNRCC Rules, Chapter 238-Well Drillers and Water Well Pump Installers.
- C. Restoration of Cores Through Pavement. Boreholes or other cored penetrations of pavements shall be restored with the same or equivalent materials as the existing pavement. Do not restore the pavement until the borehole grout has taken initial set to allow for any settlement or shrinkage of the grout.

7.9.0 GEOTECHNICAL REPORT

A sample Table of contents for a typical geotechnical report follows:

Summary:

Field Investigation and Laboratory Testing

1. Introduction
2. Field Investigation
3. Laboratory Testing

Interpretive Report

4. Site Characterization
5. Design Criteria and Recommendations
6. Ground Faults
7. Construction Considerations
8. Monitoring
9. Earthwork Specification and Recommendations

Attachments

- A. Geotechnical report for trench safety system shall be provided for all City of San Antonio projects with excavation over 5 feet deep. Report shall satisfy statutory requirements for contacting for trench safety construction.

END OF CHAPTER

Chapter 8

STANDARD DRAWINGS

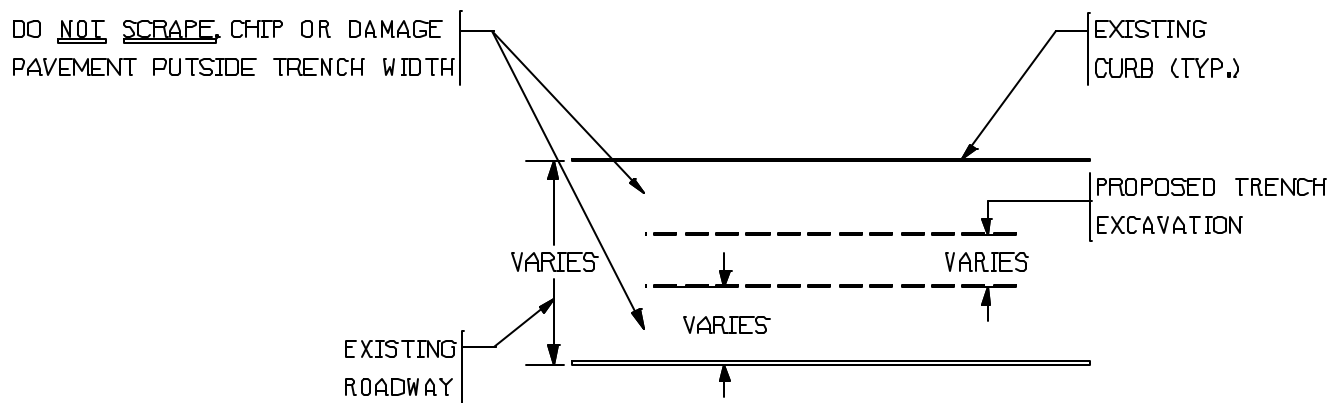
STANDARD DRAWINGS

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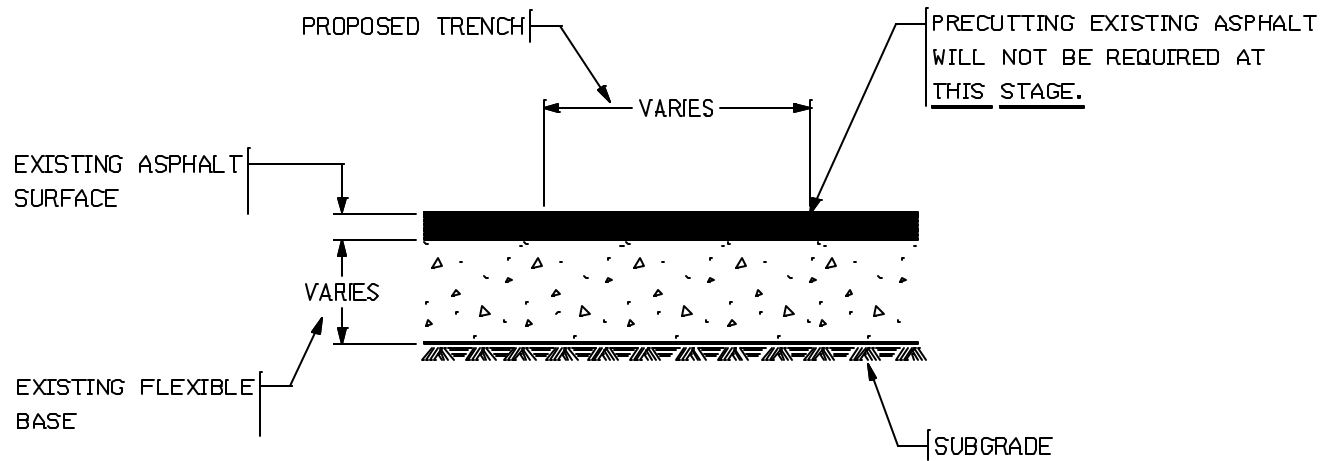
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EXISTING ROAD**

STANDARD DRAWING NO. 8.1



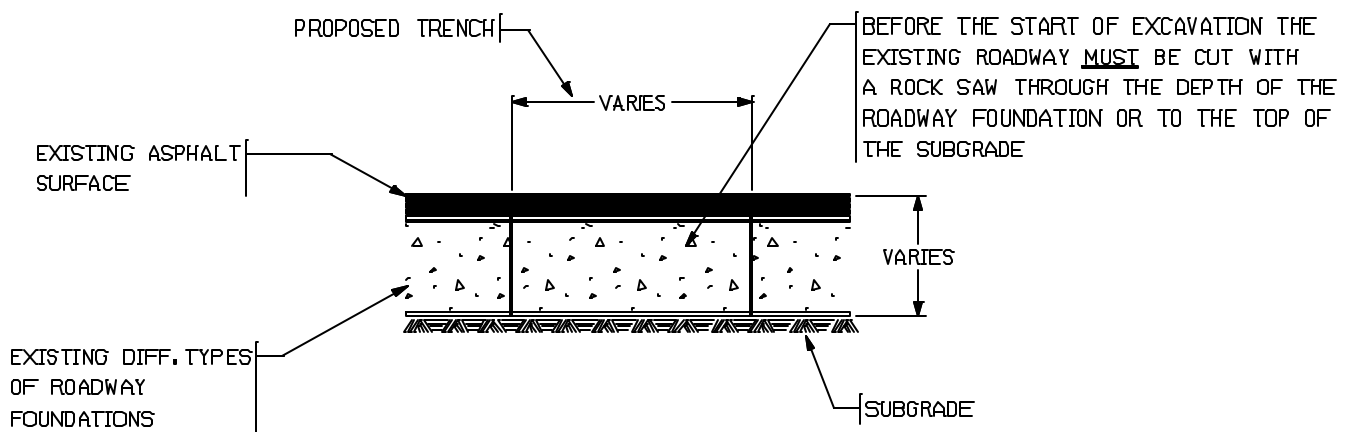
EXISTING ROADWAY WITH FLEXIBLE BASE

STANDARD DRAWING NO. 8.2



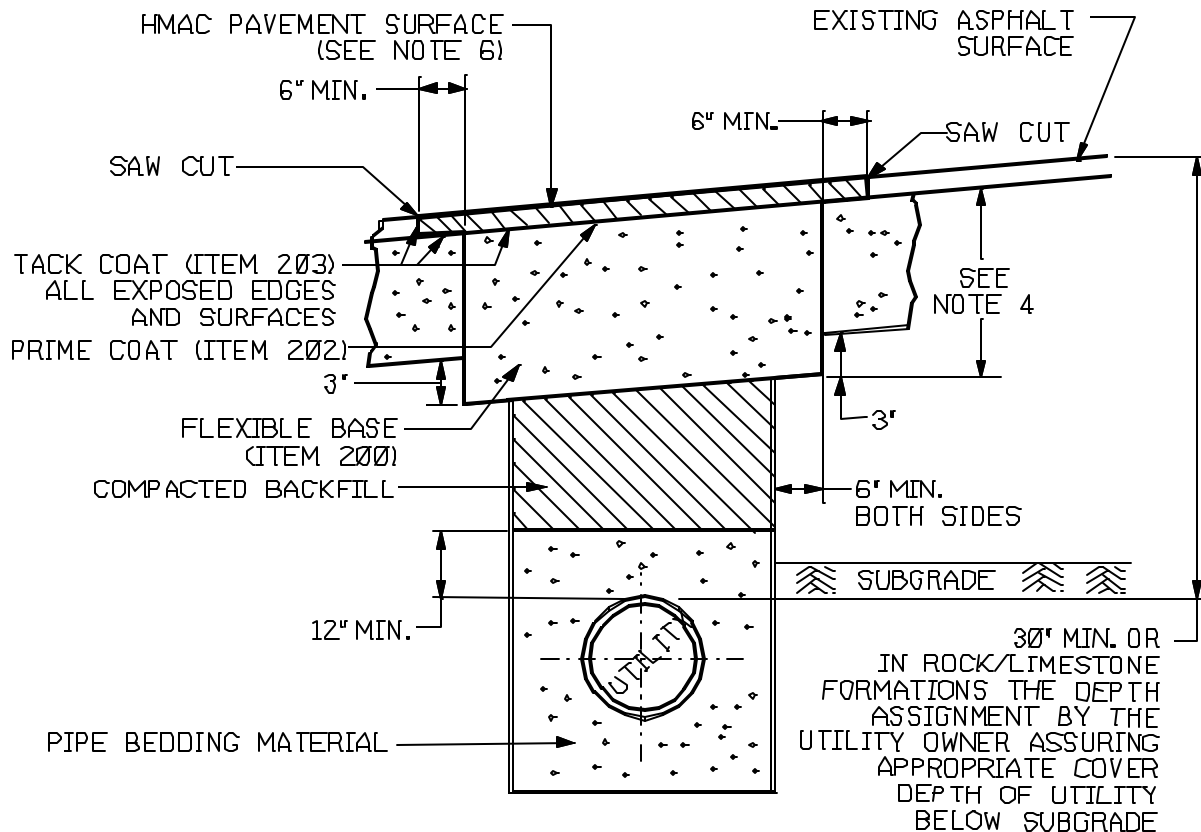
**EXISTING ROADWAY
WITH FLEXIBLE BASE
Saw Cut Procedure**

STANDARD DRAWING NO. 8.3



TRENCH REPAIRS IN EXISTING FLEXIBLE PAVEMENTS

STANDARD DRAWING NO. 8.4

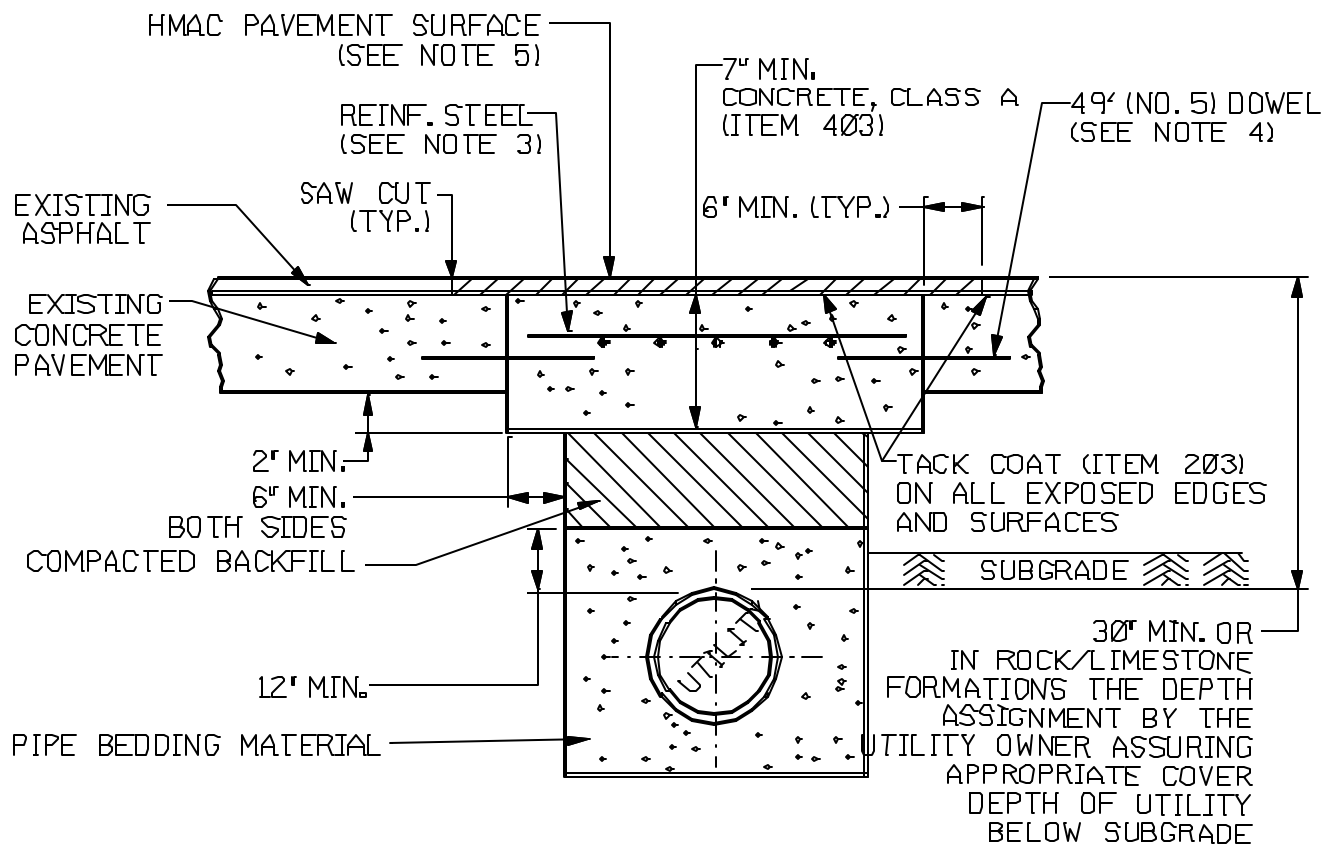


NOTES:

1. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE A MINIMUM OF 12" WIDER THAN UNDISTURBED SIDES OF THE TRENCH SYMMETRICAL ABOUT THE CENTER LINE OF THE EXCAVATION.
2. ANY CONCRETE PAVING SHALL BE SAW CUT 6" WIDER THAN UNDISTURBED SIDES OF EXCAVATION.
3. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE, THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE WITH COLD MIX AC OR TEMPORARY HMAC.
4. ROAD BASE SHALL BE REPLACED IN KIND WITH BASE THICKNESS EQUAL TO EXISTING BASE THICKNESS PLUS 3", BUT IN NO CASE LESS THAN 12".
5. DAMAGED PAVEMENT OUTSIDE THE TRENCH CUT SHALL BE REMOVED AND REPLACED WITH A BASE THICKNESS OF 10" OR A THICKNESS MATCHING EXISTING, WHICHEVER IS GREATER.
6. REPLACEMENT AC SURFACE LAYER SHALL BE OF THE TYPE AND THICKNESS BASED ON FUNCTIONAL CLASSIFICATION.
 - a) MIN. 2" HMAC TYPE "D" FOR TRENCH REPAIR IN LOCAL/RESIDENTIAL STREETS.
 - b) MIN. 3" HMAC TYPE "C" MODIFIED FOR TRENCH REPAIR IN COLLECTOR/ARTERIAL STREETS.
 SEE ITEM 340, SECTION 340.3 (2).
7. CLASS "J" PCC CONCRETE (ITEM 403) OR CONTROLLED LOW STRENGTH MATERIAL (CLSM) MAY BE SUBSTITUTED IN THESE REPAIRS FOR THE FLEXIBLE BASE AND COMPACTED BACKFILL. PCC CONCRETE GREATER THAN A 2 SACK MIX WILL NOT BE ALLOWED.

TRENCH REPAIRS IN EXISTING PCC PAVEMENTS WITHOUT REINFORCING STEEL

STANDARD DRAWING NO. 8.5



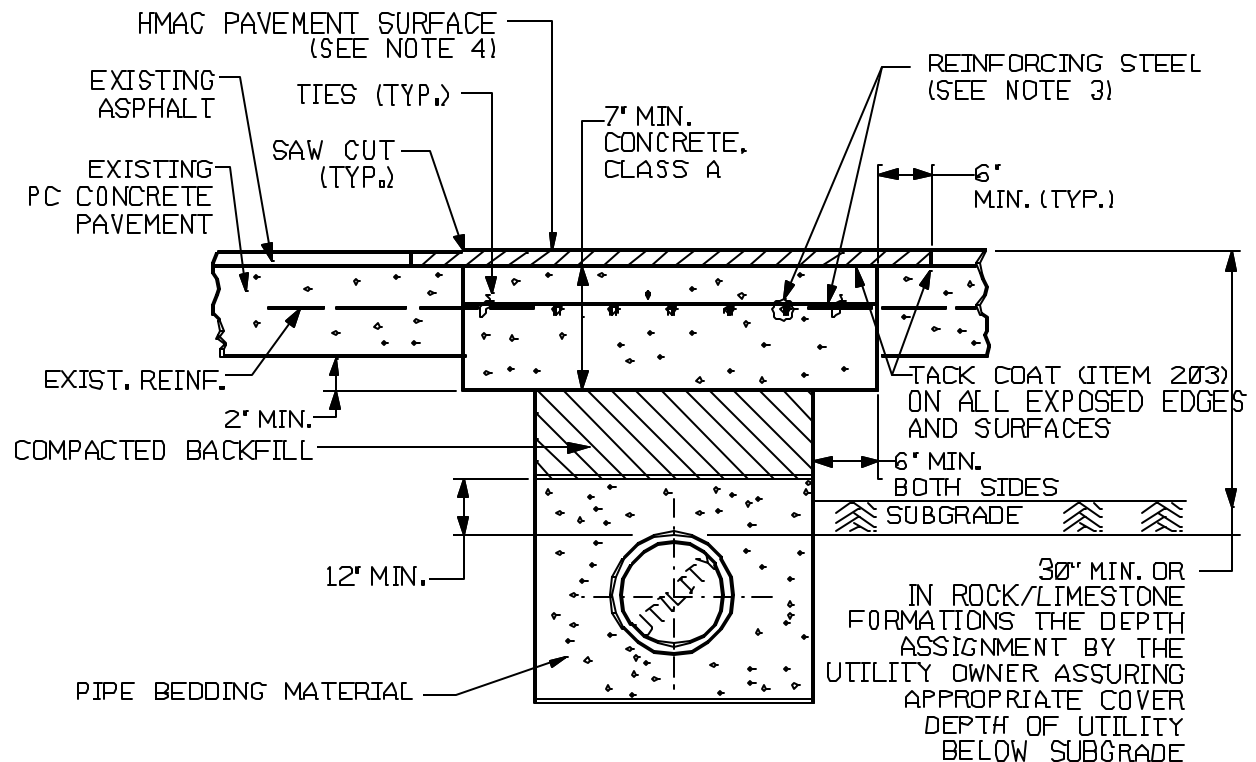
NOTES:

- EXISTING PC NONREINFORCED CONCRETE SHALL BE SAW CUT TO A MINIMUM DEPTH OF $1\frac{1}{2}$ " AT A MINIMUM DISTANCE OF 6" BACK OF THE VERTICAL WALL OF THE UTILITY TRENCH.
- REPLACEMENT CONCRETE SHALL BE CLASS A AND SHALL MATCH EXISTING FINISH AND THICKNESS, BUT THE THICKNESS SHALL NOT BE LESS THAN 7".
- REINFORCING STEEL IN THE REPLACEMENT SLAB SHALL BE AT LEAST NO. 4 BARS. REINFORCING STEEL SHALL BE LAP SPLICED ACCORDING TO ITEM NO. 406. IF LENGTH OF LAP CAN NOT BE ACHIEVED, BARS SHALL BE WELDED A MINIMUM LENGTH OF 6"
- NO. 4 DOWELS SHALL BE INSTALLED AT 12" ON CENTER FOR EXISTING PAVEMENT THICKNESSES 6" OR GREATER.
- REPLACEMENT AC SURFACE LAYER SHALL BE OF THE TYPE AND THICKNESS BASED ON FUNCTIONAL CLASSIFICATION.
 - MIN. 2' HMAC TYPE 'D' FOR TRENCH REPAIR IN LOCAL/RESIDENTIAL STREETS.
 - MIN. 3' HMAC TYPE 'C' MODIFIED FOR TRENCH REPAIR IN COLLECTOR/ARTERIAL STREETS.

SEE ITEM 340, SECTION 340.3 (2).
- CLASS 'J' PCC CONCRETE (ITEM 403) OR CONTROLLED LOW STRENGTH MATERIAL (CLSM) MAY BE SUBSTITUTED IN THESE REPAIRS FOR THE FLEXIBLE BASE AND COMPACTED BACKFILL. PCC CONCRETE GREATER THAN A 2 SACK MIX WILL NOT BE ALLOWED.

TRENCH REPAIRS IN EXISTING PCC PAVEMENTS WITH REINFORCED STEEL

STANDARD DRAWING NO. 8.6



NOTES:

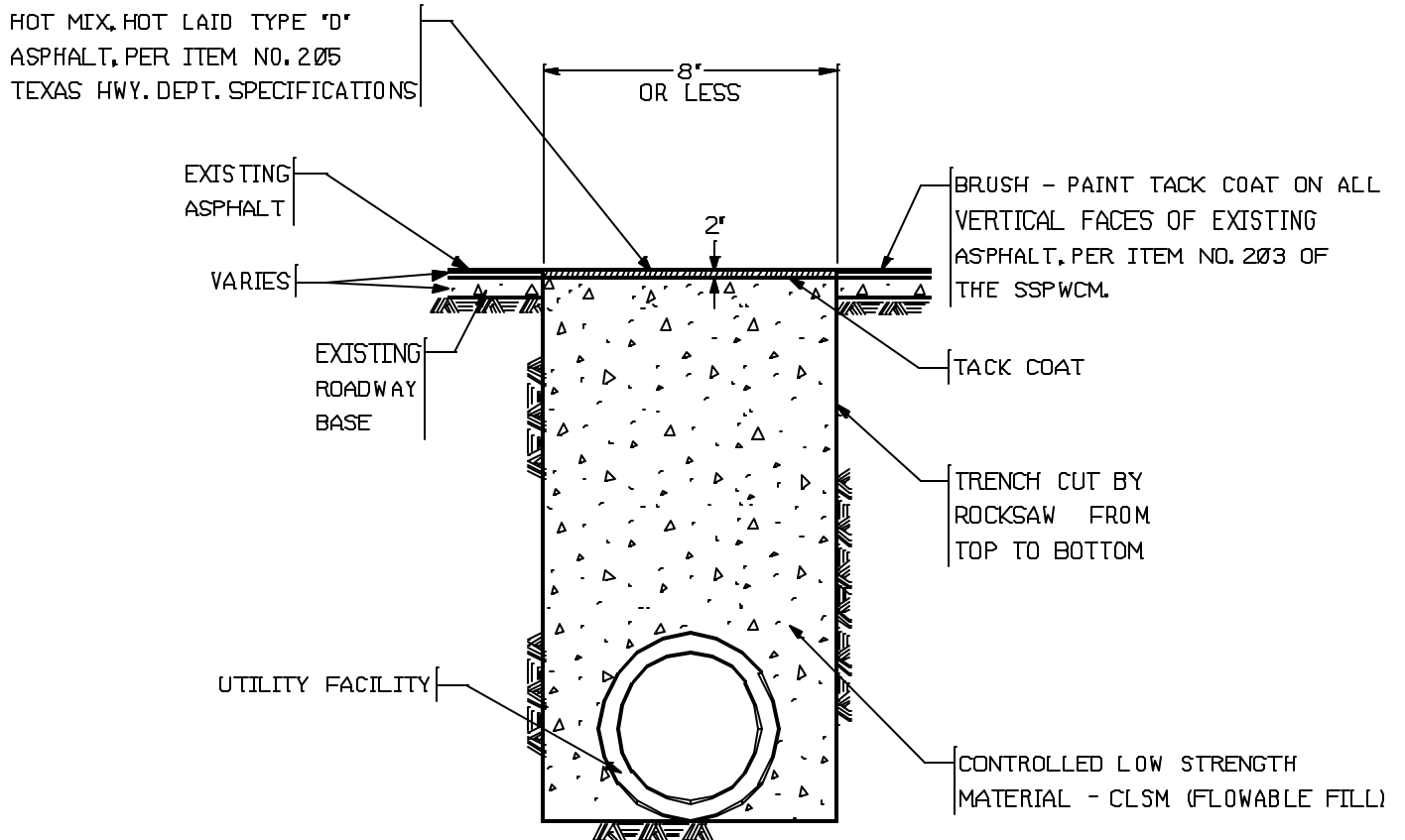
- EXISTING REINFORCED CONCRETE SHALL BE SAW CUT TO A MINIMUM DEPTH OF 1 1/2' AT A MINIMUM DISTANCE OF 6" BACK OF THE VERTICAL WALL OF THE UTILITY TRENCH.
- REPLACEMENT REINFORCED CONCRETE SHALL BE CLASS A AND SHALL MATCH EXISTING FINISH AND THICKNESS, BUT THE THICKNESS SHALL NOT BE LESS THAN 7'.
- REINFORCING STEEL IN THE REPLACEMENT SLAB SHALL BE AT LEAST NO. 4 BARS. REINFORCING STEEL SHALL BE LAP SPLICED ACCORDING TO ITEM NO. 406. IF LENGTH OF LAP CAN NOT BE ACHIEVED, BARS SHALL BE WELDED A MINIMUM LENGTH OF 6'.
- REPLACEMENT AC SURFACE LAYER SHALL BE OF THE TYPE AND THICKNESS BASED ON FUNCTIONAL CLASSIFICATION.
 - MIN. 2" HMAC TYPE "D" FOR TRENCH REPAIR IN LOCAL/RESIDENTIAL STREETS.
 - MIN. 3" HMAC TYPE "C" MODIFIED FOR TRENCH REPAIR IN COLLECTOR/ARTERIAL STREETS.

SEE ITEM 340, SECTION 340.3 (2).

- CLASS "J" PCC CONCRETE (ITEM 403) OR CONTROLLED LOW STRENGTH MATERIAL (CLSM) MAY BE SUBSTITUTED IN THESE REPAIRS FOR THE FLEXIBLE BASE AND COMPACTED BACKFILL. PCC CONCRETE GREATER THAN A 2 SACK MIX WILL NOT BE ALLOWED.

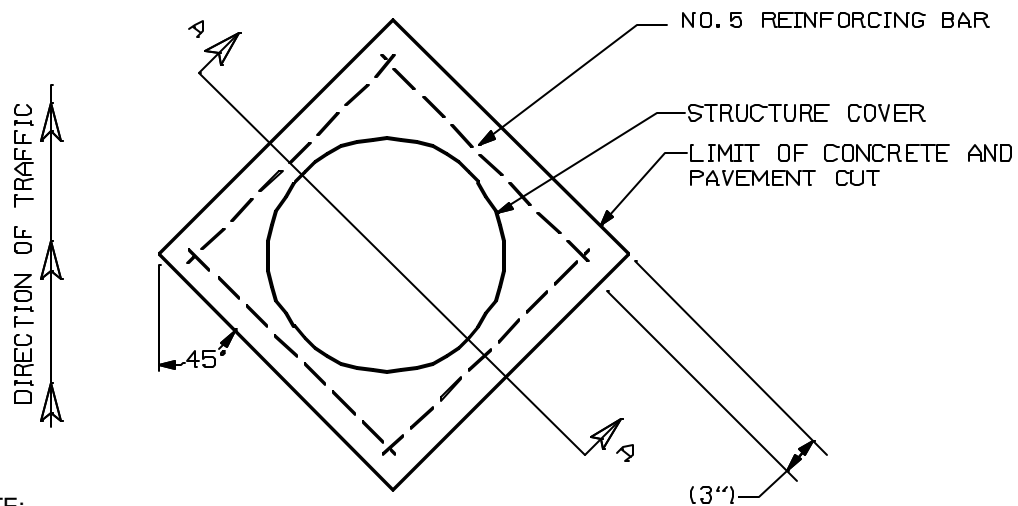
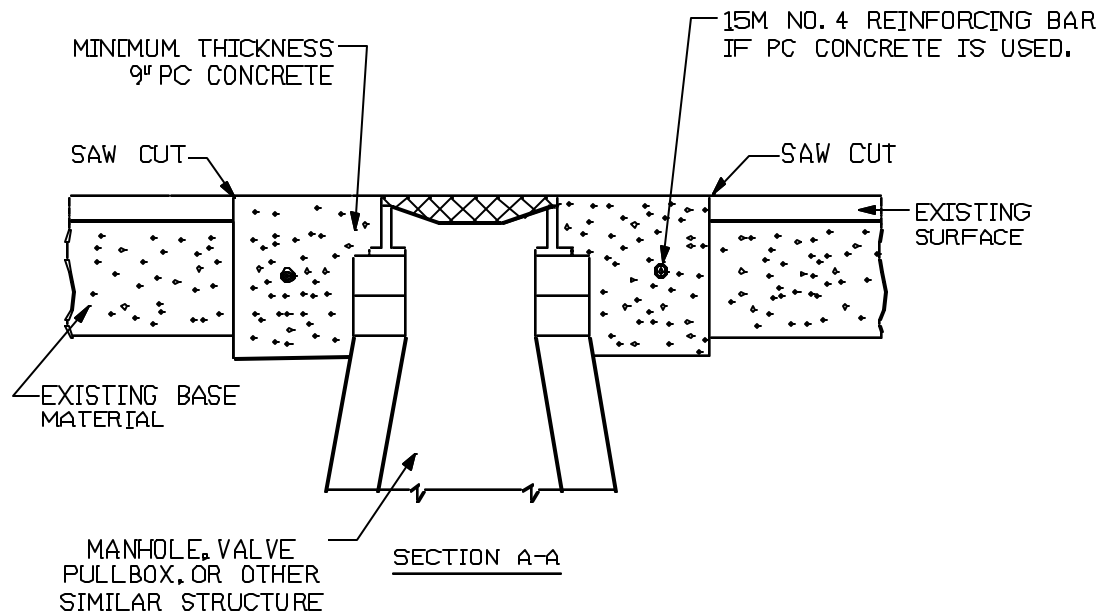
NARROW TRENCH CUT

STANDARD DRAWING NO. 8.7



MANHOLE AND VALVE ADJUSTMENT

STANDARD DRAWING NO. 8.8



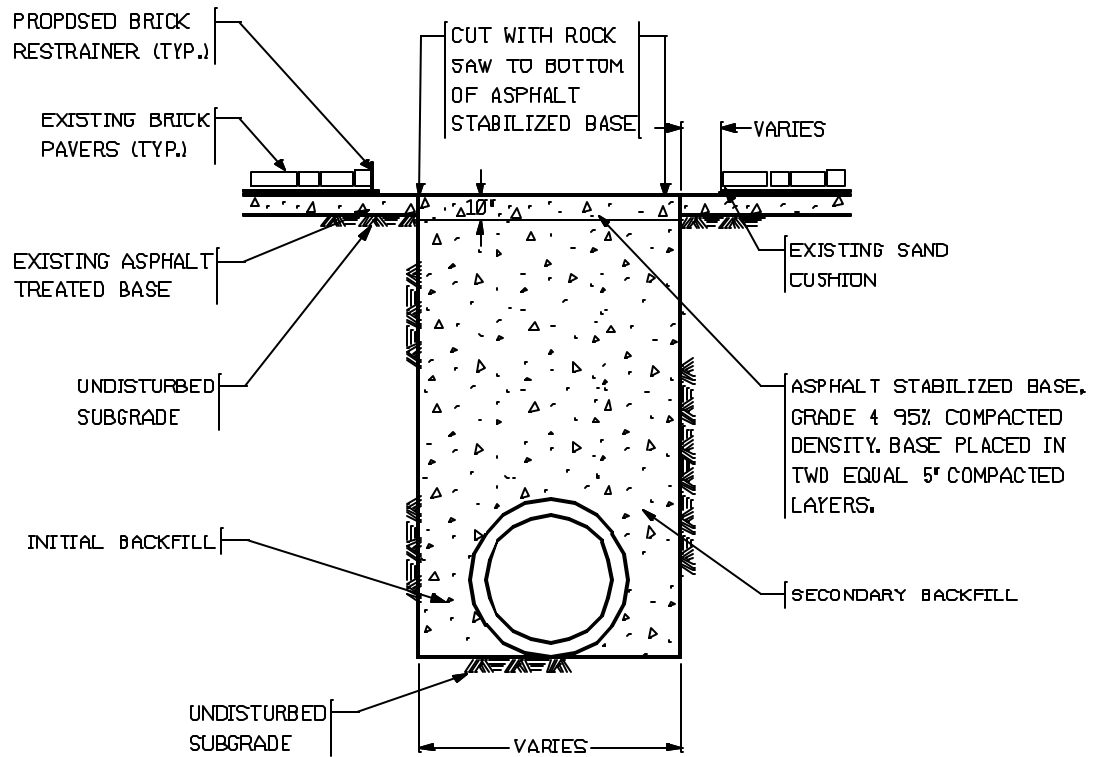
NOTE:

THE CONCRETE SHALL BE 3000 PSI, MIN, AND REINFORCED WITH NO. 4 BARS, AS SHOWN.

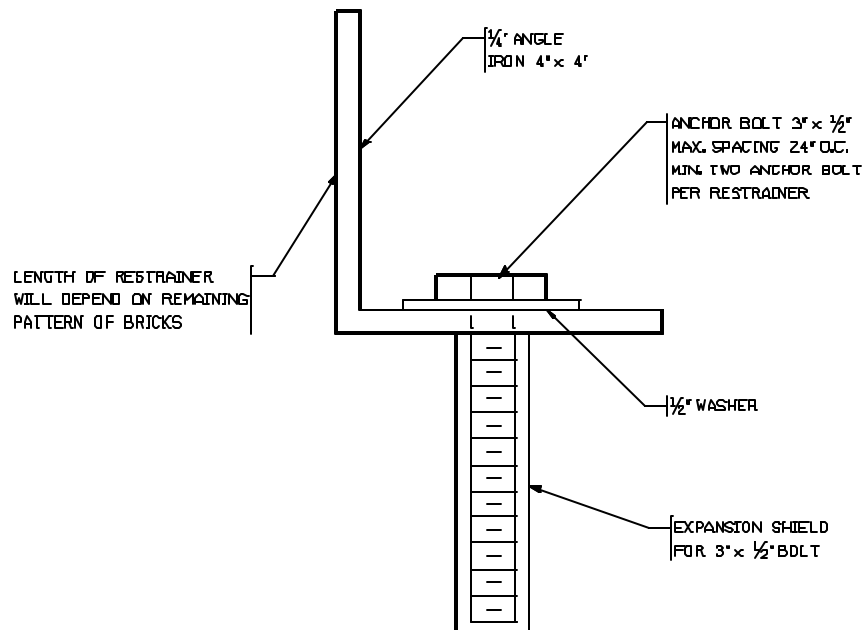
THE CONCRETE SHALL EXTEND TO EDGE OF SAW CUT PAVEMENT EDGE.

BRICK SURFACE STREET DETAIL

STANDARD DRAWING NO. 8.9

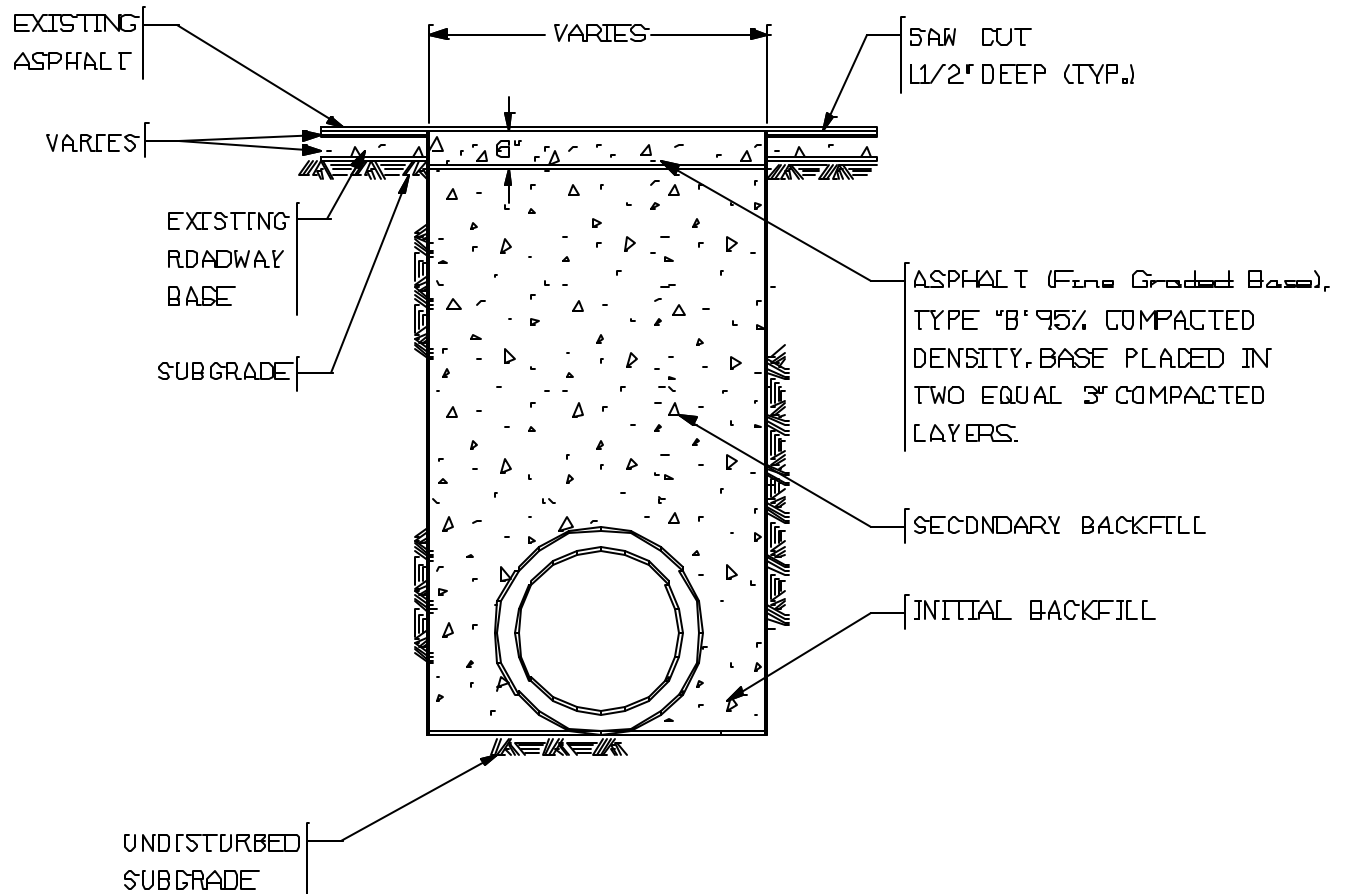


BRICK RESTRAINER DETAIL



STREETS TO BE RECONSTRUCTED
ADJUSTMENTS FOR CAPITAL IMPROVEMENT PROJECTS

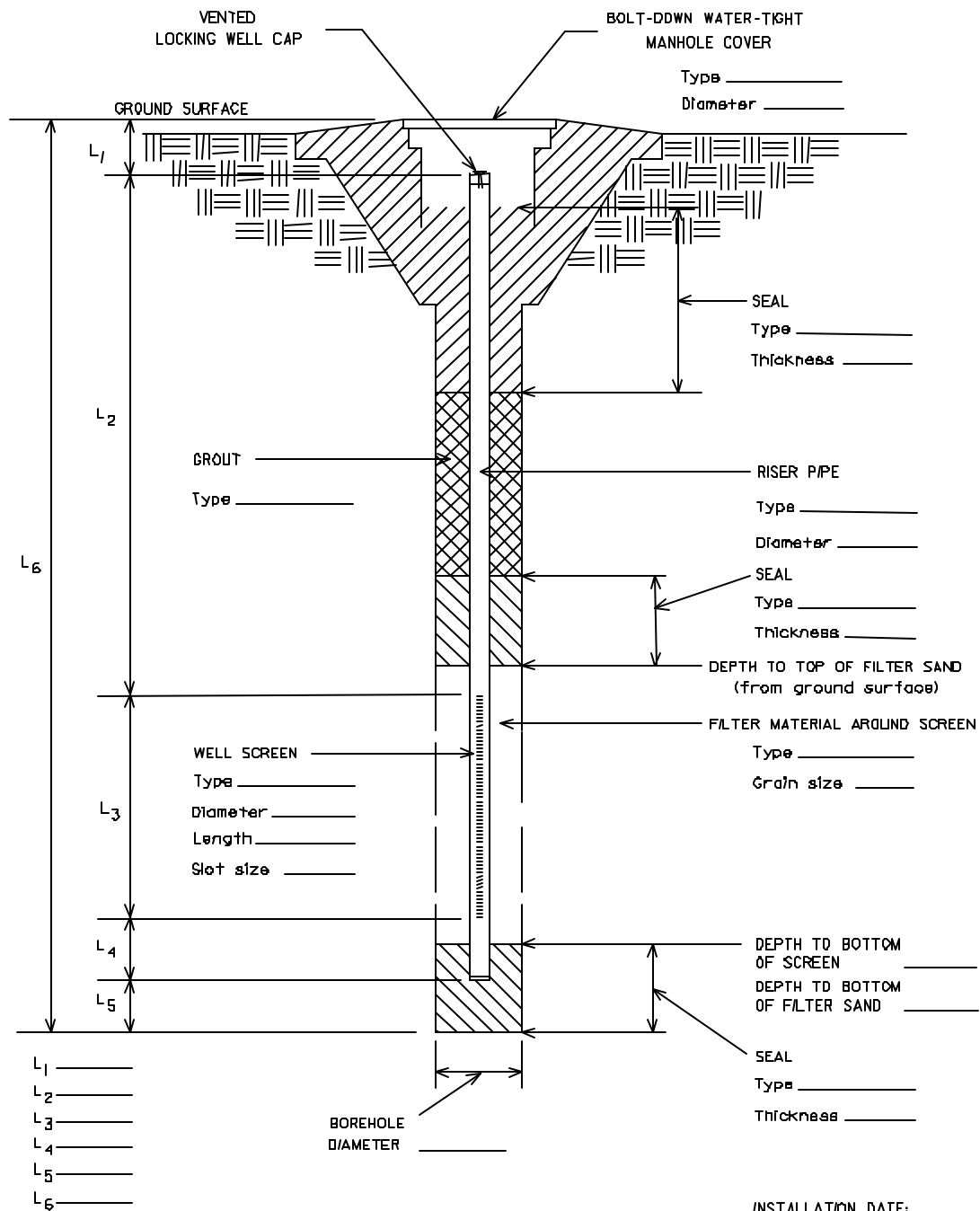
STANDARD DRAWING NO. 8.10



3/27/01

MONITDR WELL DETAIL

STANDARD DRAWING 8.11



DRILLING CONTRACTOR(S) NAME: _____

INSTALLATION DATE:
DATE _____ TIME _____